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AN INTRODUCTION
TO THE
ARTS AND SCIENCES:
—
AN ESSAY ON EDUCATION,
(CONTAINING)
OBSERVATIONS AND REMARKS ON THE DUTIES
OF TEACHERS, AND OF PARENTS AND PUPILS;
AND ALSO
LISTS OF THE BEST AND THE MOST APPROVED
SCHOOL BOOKS IN EVERY
DEPARTMENT OF EDUCATION,
BY
A. NESBIT AND SONS,
OF KENNINGTON-HOUSE ACADEMY.

"The Ignorance and the Want of Art and Skill, exhibited by the Human Race, are almost unbearably painful; and a long series of Time must intervene before any Individual can attain to that Measure of Knowledge which he is capable of acquiring. This apparent Disadvantage, however, is amply compensated by the wide Range allowed to Human Instinct, and by the Degree of mental Improvement, which is continued almost through the whole of Life."—*SHAKESPEARE'S Hamlet.*

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(See Page 105.)



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AN ESSAY ON EDUCATION.

KENNINGTON-HOUSE ACADEMY,
COMMERCIAL, MATHEMATICAL, AND PHILOSOPHICAL;
No. 38, KENNINGTON-LANE,

OPPOSITE CARLISLE CHAPEL, LAMBETH, NEAR LONDON;

CONDUCTED BY

A. NESBIT AND SONS,

WITH

PROPER AND EFFICIENT ASSISTANTS.

THE TERMS OF MESSRS. NESBIT'S ESTABLISHMENT FOR BOTH
BOARDERS AND DAY SCHOLARS, MAY BE KNOWN ON APPLI-
CATION, EITHER PERSONALLY OR BY LETTER; AND THE
MOST RESPECTABLE REFERENCES CAN BE GIVEN TO
GENTLEMEN OF HIGH LITERARY ATTAINMENTS.

"The Degrees and the Species of Art and Skill, exhibited by the Human Race, are almost infinitely varied; and a long Space of Time must intervene before any Individual can attain to that Measure of Knowledge which he is capable of acquiring. This apparent Disadvantage, however, is amply compensated by the wide Range allowed to Human Intellect, and by the Capacity of mental Improvement, which is continued almost through the whole of Life."—SHEPHERD ON EDUCATION.

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651.

The following highly approved Books, have been written by Mr. A. NESBIT; and are all published by Longman and Co., London; Wilson and Sons, York; and may be had of the Author, and of all Booksellers.

Mr. Nesbit's Treatise on English Parsing, adapted to Murray's Grammar, has attained the Sixth Edition. This Work forms a Key to the First Part of Murray's Exercises; was highly approved by that Gentleman; and is considered, by competent judges, to be the best Treatise on English Parsing, that has ever been published. It is equally well adapted for Public Schools, Private Tuition, and Self Improvement; and abounds with Explanatory Notes and Observations, which will be found of great Advantage to Learners, in studying the English Language.

The Treatise on Practical Arithmetic, is in the Third Edition, and contains the most concise and general Methods of making Commercial Calculations, now universally adopted by Men of Business. The Work also comprises Forms of Receipts, Promissory Notes, Bills of Exchange, Bill Books, Invoice Books, Bills of Lading, Sale Books, Account Current Books, and Commercial Letters. In short, it forms a Complete Introduction to Book-keeping; has been introduced into many of the First Schools in the United Kingdom; and also into many of the Counting Houses in Manchester and other Commercial Towns; and it will be found well adapted for preparing Young Men for the proper discharge of their duty, when they enter upon the Transactions of REAL LIFE and BUSINESS.

The Treatise on Practical Mensuration, has reached the Tenth Edition, and treats Extensively on the Subject, in all its various departments; namely, Superficies, Solids, Conic Sections, Timber Measure, &c., &c. This Work will be found well worthy of the particular Attention, not only of those Young Gentlemen who are designed for Architects, Civil Engineers, &c., &c.; but also of Builders, Carpenters, Joiners, Masons, Bricklayers, Slaters, Tilers, Painters, Glaziers, Plumbers, and all other Artificers. The Work has been well received by the Public; and has, for many years, been a Standard Book, in Schools of the First Respectability; and also in the Offices of Architects, Engineers, Timber Merchants, Builders, &c., &c.

The Treatise on Practical Land Surveying, has arrived at the Seventh Edition. This Work treats copiously on the various Methods of Measuring and Planning single Fields, Meres, and Woods, of every Shape and Denomination. It also contains four of the most approved Methods of Surveying and Planning Large Estates, or Lordships; and describes the various processes pursued in Laying-out, Parting-off, and Dividing Land. This Work has for many years been a Leading Book in Schools, particularly in Agricultural Districts; and has been introduced into the Offices of many Land Surveyors, Civil Engineers, Commissioners of Inclosures, &c., &c., for the Advantage and Improvement of their YOUNG MEN.

The Treatise on Practical Gauging, will be found to contain every Thing on that Subject, which is necessary for Young Gentlemen to understand, previously to their becoming Candidates for the Excise or Customs; as it treats of the various Methods of Gauging and Inching Utensils of every Denomination.

A SHORT
ESSAY ON EDUCATION;
WITH
OBSERVATIONS AND REMARKS
ON
THE DUTIES OF TEACHERS, PARENTS,
AND PUPILS.

MR. NESBIT and SONS most respectfully embrace this Opportunity of presenting their very grateful Acknowledgments, to their Friends and the Public, for the liberal and extensive Patronage with which they have been honoured, since they opened their Academy; and wish to assure them that it shall ever be their highest Ambition to merit the Continuation and Increase of their Favours, Kindness, and Support.

This, they are fully aware, can only be accomplished by persevering and renewed Exertions in discharging the Duties of their Office with Diligence, Punctuality, and Propriety; but above all, with Efficacy and Success, as regards the general Improvement of their Pupils in Scientific, Useful, and Practical Knowledge.

Every attention is paid to the Health, Happiness, and Morals of both the Boarders and Day Scholars; and proper Time is allowed them for Amusement, Exercise, and Recreation; as without these, Health and Cheerfulness cannot be preserved; and Mr. Nesbit and Sons

feel a confident Hope, that their Abilities, Assiduity, and long Experience in the Education of Youth, will enable them to give General Satisfaction to those Parents and Guardians who may place their Sons or Wards in the Establishment.

MR. NESBIT and SONS feel great Pleasure in announcing to their Friends and the Public, that they have lately erected a Large and Commodious School-Room, which is well lighted and ventilated ; and fitted up in the most convenient manner, for the Reception, Accommodation, and Comfort of their Pupils.

It is well known that Health of Body and Vivacity of Spirits, cannot long be preserved without good and convenient Ventilation ; and a free and copious admission of pure, atmospheric Air into those Apartments designed for the Education of Youth.

Both these desirable Advantages have been effectually secured by the peculiar Manner in which they have constructed the Building ; and they have also made such internal Arrangements as will be of great Utility in conducting the Business of the School ; besides being of the utmost Importance in promoting both their own Health and Comfort, and likewise the Health, Comfort, and Happiness of their Pupils.

THE FIRST AND GRAND CONSIDERATION, in bringing up and educating Youth, is to endeavour to preserve and promote their Health, and the Buoyancy of their Spirits, by making them comfortable, cheerful, and happy ; for without Health and Spirits, little Progress will ever be made in the Acquisition of Knowledge.—These desirable Objects can only be obtained by sufficient Exercise in the open Air, by kind and gentle

Treatment, by making all their Studies as easy and as delightful to them as possible ; and by proving to them that the whole of your Exertions and Instructions are intended to advance their Moral and Intellectual Improvement, and to make them Useful and Honourable Members of Society.

It must be acknowledged that the Dispositions of Children are extremely diversified. Some are mild, gentle, tractable, and even endearing ; and others are obstinate, headstrong, resolute, and very untoward, in all their actions. To these it becomes our Duty to administer Reproof, Admonition, Advice, and sometimes Correction ; but all this should be done in a mild and gentle Manner, in Order to prove that it is only our Intention to produce a desirable Change in the Manners, Tempers, and Dispositions of our Pupils ; and not to gratify any Whim or Caprice that may have arisen in our own Minds, from their careless or improper Conduct.

As the Happiness of Parents, and also that of their Children are inseparably bound up together ; nothing is more likely to secure Peace, Comfort, and Prosperity to both, than the regular Advancement of the latter in General, Scientific, Moral, and Religious Knowledge. These are Attainments of the utmost Value and Importance, both as regards this World and that which is to come ; and should always be kept in View by PARENTS, by GUARDIANS, and by all INSTRUCTORS OF YOUTH.

THE EDUCATION OF YOUTH, has in all Ages, and in all Nations, formed a Grand Theme for Contemplation; and Emperors, Kings, Princes, Nobles, Commons, and the Public, both in Savage and Civilized Countries, have bent their best Attention to this important and highly momentous Subject.

It would not be difficult to prove, that nearly all Nations have advanced in Power and Prosperity, in the same Proportion that they advanced in Civilization and in general Knowledge; and the Decline and Fall of most Kingdoms and Empires, may be traced to the Decline, Relaxation, and Carelessness manifested in the Education of the different rising Generations.

It has been well said that, "Knowledge is Power;" for this holds good, in all the Departments of Life; and may be seen, not only in the different Mechanical Powers, as applied to the Construction of various useful Machines; but also in every Trade, Occupation, and Pursuit that engage the Time, Talents, and Attention of MAN.

SOLOMON says, "Wisdom is the principal Thing; therefore, get Wisdom; and with all thy getting, get Understanding." And again he says, "Get Wisdom, get Understanding; and forget it not."—Wisdom, Knowledge, and Learning are undoubtedly of intrinsic, and of inestimable Value; but these high, lofty, and excellent Attainments can only be acquired by diligent and persevering Study, by great and unremitting Attention, by the careful Perusal of Moral, Religious, Scientific, and other proper Books, on particular and general Subjects, by Experience in the practical Affairs of the World, by obtaining Information, and learning Prudence from the passing Events of Life; and, above all, by receiving Instructions under the Direction of able, judicious, diligent, and experienced Teachers. It is only from the Combination of all these Means, that Young Persons can ever expect to obtain an extensive Fund of General, Scientific, Useful, and Practical KNOWLEDGE.

MUCH has been written, and much has been spoken, relating to the Natural Talents, Abilities, and Capacities of Children; and after the Experience of Forty Years, we certainly do aver, that we never had one Child placed

under our Care, who was not capable of learning Something useful to himself, and beneficial to the Community.—In fact, we mean to say, that with proper Care, Management, and Cultivation, Nine Hundred and Ninety-Nine Boys out of every Thousand, might be brought to learn every Thing that is necessary to make them useful and honourable Members of Society.

That the Abilities of Young Persons differ considerably cannot be disputed; and the Great Author of our Being has given us another wonderful Proof of his Infinite Wisdom in the diversified Talents and Dispositions which he has bestowed upon the Children of Men.

If all Persons had been created with the same Inclinations, and with equal Powers of Mind, how would the different Occupations, Pursuits, and Businesses of Life have been carried forward? One Boy feels an Inclination for some particular Calling; another Boy chooses some other Trade or Profession; and a third fancies that his Talents will enable him to succeed in various Undertakings; and thus are *carried on* the numerous Avocations of this diversified World.

Parents generally observe and carefully watch over the Openings of the Minds of their Children, endeavour to discover their various Inclinations, and consult with them in choosing suitable Trades or Professions; and it is the Duty of every Teacher to study the Tempers and Dispositions of his Pupils, to notice their different Capacities, to *find out* the natural Bent of their Genius; and to cultivate all their Talents to the utmost of his Power.

It is also the Duty of every Teacher to prove to his Pupils, that he is, and wishes to be their real Friend, not by Words only, in giving them Instructions, Advice, and Encouragement; but by kind and affectionate Treatment; by giving them due Assistance in all their Studies; by elucidating and explaining every Science, in such a Manner as to bring it within their Comprehension; and by evincing in all his Actions, that he is desirous of promoting their real Improvement, Welfare, and Happiness.

Minor Faults, Omissions, or Oversights should by no means be excused; but they should be treated with a gentle and an indulgent Hand.—Severe Admonitions, Reprimands, or Chastisements should be reserved for greater Offences;—Harshness and Severity should never be used,

until all gentler Means have proved ineffectual in rectifying or reclaiming the Pupil.

Many of the Follies, Inadvertencies, and Mistakes of Young Persons, arise not from real Carelessness, or from a Perverseness of Disposition, but from want of proper Admonition, Advice and Instruction; and, if these were duly administered in a judicious Manner, they would seldom fail in producing the desired Effect.—Of all the Numbers whose Education we have superintended, we do not recollect one Boy in whom these Means did not produce some Improvement that merited Praise and Commendation; either in his Temper, Talents, Generosity, Ingenuity, or Behaviour; or in his *General Conduct*, and his Advancement in Learning and Knowledge.

Besides, it should be remembered that Young Persons labour under great Disadvantages for want of Experience, which is the Great and Grand Teacher of all Mankind; and we must certainly say, that those Persons must be very *stupid* and *headstrong* indeed, who will not learn at the SCHOOL OF EXPERIENCE.—Dr. Franklin says, “Experience keeps a dear School, but Fools will learn at no other, and scarcely at that.”—This Observation is too often proved to be literally true, by the Actions and Conduct of many Persons who have had Time and Opportunities of acquiring Practical Knowledge; but who have neglected to profit by the Instructions conveyed in the passing Occurrences and Events of Life.

If the Methods of Tuition which we have recommended, and which we have long practised, with great Success, were judiciously pursued by Teachers, we should hear very little more of careless, dull, idle, disobedient, and refractory Children; but unfortunately for Learners, these Methods and Considerations are generally either entirely neglected, or very little regarded by many of the Instructors of Youth.

The consequences of this unpardonable Neglect, present themselves in the little Progress that Boys generally make in their Learning; in their Disregard of proper and scientific Books, and Self Improvement; in the careless and supine Manner which they display in the Pursuit of their Studies; in the Aversion and Dislike which they often manifest towards Schools and Schoolmasters; and in the Complaints that Teachers are continually making against their Pupils.

We boldly maintain that there are very few Boys indeed, *however limited* may be their capacities, that are not

capable of receiving a good and a useful Education; if they be *treated* and *managed* according to the Methods which we have *laid down*, and recommended. But this cannot be expected from Teachers who have not a sufficient Knowledge of the various Departments of Learning; or who are destitute of a pleasing and happy Mode of conveying Instruction; or who, for want of Experience, are ignorant of the best and most judicious Methods of Conducting and Managing a SCHOOL.

It is well known that a Person may have great Talents and Acquirements; and may yet want that Facility and Address, in communicating Knowledge to his Pupils, that are so desirable and necessary in a Schoolmaster.—William Emerson, the great Mathematician, and Dr. Samuel Johnson, the great Linguist, both failed in their Attempts to establish Schools; not for want of Knowledge, but from a want of Experience, Patience, and Perseverance; and, from the lack of a happy and judicious Method of giving or conveying their Instructions to their PUPILS.

The Duties of Teachers embrace such a Variety of Objects, and involve such a Multiplicity of Considerations, that it is impossible to notice them all in a short Essay like the present; and much will always depend upon their own Wisdom, Prudence, and Vigilance in adapting their Advice, Instructions, and Admonitions to the Tempers, Inclinations, and Dispositions of their Pupils; and to the Nature and Importance of such Circumstances as may arise, in conducting their Schools.—Besides, what we have already advanced, on the Duties and Responsibilities of Teachers, we may, however, still be permitted to make the following brief, general, but comprehensive Summary:—Every Instructor of Youth, should labour to render every Science as easy, as familiar, and as pleasant as possible to his Pupils; he should endeavour to make them comprehend every Operation, and to perform it with Accuracy and Dexterity; he should encourage them to persevere in their Studies, by assuring them that Diligence and Assiduity, with due Assistance, will make Doubt and Difficulty give way before them; he should exhort them to Habits of Cheerfulness, Carefulness, and Industry; he should endeavour to place their Duty and their Interest before them, in the most conspicuous Light; he should point out to them the great Advantages resulting from Sci-

entific and General Knowledge; he should admonish them for wasting their valuable Time in trivial Pursuits; and he should chide and reprove them for Remissness, Inattention, Stubbornness, and Disobedience.

Every Teacher should impress upon his Pupils, the Necessity and Advantage of cultivating and improving their Tempers; he should urge them to practise Gentleness and Affability of Manners; he should enjoin them to love, honour, and obey their Parents, and to be courteous and kind to their Friends; he should inculcate Principles of Rectitude and Probity, and expatiate on the Odiousness of Dissimulation and Insincerity; he should caution them against the Danger of reading *Novels* and other *Pernicious* Books, and inform them of the exalted Sentiments and the correct Ideas that may be obtained from the Perusal of *Good* and *Proper* Books; he should point out the various Times and Occasions, when harmless and innocent Mirth and Amusement may be allowed and encouraged; also, the proper Seasons when a sedate, serious, and solemn Demeanour is expected and required.—He should tell them that Exercise and Temperance are the best Preservatives of Health, and inform them that too much Sleep relaxes and debilitates the *Animal System*; he should hold up to their View, the Example of those, who by their Knowledge, Integrity, and Benevolence, have done Credit to the Christian Name; he should excite them to be thankful for the *Civil* and *Religious* Liberty which we enjoy, in this Country, when compared with other Nations; he should inspire them with Sentiments of Gratitude for the numerous Blessings that we are all continually receiving from the Bountiful Hand of the Almighty; he should direct their Thoughts to the Contemplation of the Power, the Wisdom, and the Goodness of God, as displayed in the Works of Creation; he should enjoin them to love and reverence the Scriptures of Divine Truth, and keep holy and sacred the Sabbaths of the Lord; and he should use every Means in his Power to fire their youthful Bosoms with a Love for Learning, Virtue, Religion, and every other Thing that does Honour to HUMAN NATURE.

SCHOOLMASTERS should always endeavour to gain the Confidence, and secure the Assistance, Support, and Co-operation of PARENTS; for we have always found them

most powerful AUXILIARIES in producing Diligence, Obedience, and Docility in their Children; in explaining to them, the Advantages of our various Modes of Education; and in assisting us to carry our Views and Methods into full and *practical* Operation. These Observations, however, apply more particularly to the Parents of Day Scholars, than to those of Boarders; for the Children of the former, residing chiefly at Home, are almost entirely under the Control, Direction, and Management of their Parents; while Boarders have the Advantage of receiving the regular Advice, Instruction, Assistance, and Superintendence of their MASTERS and TUTORs.

It certainly would neither be just, right, nor proper to expect that the most able, diligent, and judicious Teacher can perform every Duty and Office that relates to the Training and the Education of Youth. Parents well know and feel this to be the case; and will, of course, *generally* use their utmost endeavours to promote their Children's advancement in Science and Knowledge; and to improve and cultivate their Tempers, to enrich and store their Minds, to enlarge and extend their Ideas, and to enable their Tutors to carry into full and complete Effect, their various MODES and SYSTEMS OF EDUCATION.

SOME PERSONS may think, and perhaps may even be inclined to say, that we have laid down the Duty of Teachers in too strong Terms; and drawn the Cords of their Profession too closely; but when we consider their great Responsibility, and the peculiar Nature of their Duties, we are of Opinion that we have not advanced more on this subject, than its Importance duly merits.—But, if we have *pointed out* a few of the Duties of Tutors, we have also Something of equal Consequence to say on the Duties of Parents and Pupils, which we hope will give Pleasure and Satisfaction to all these Parties; and be a Means of inducing them to work comfortably, cheerfully, and diligently together, for the Benefit and Improvement of the rising Generation; for without this, little Good will ever be effected.

If the Duty of Teachers be of great Importance, that of Parents is still of much greater Consequence and Importance. Their Responsibilities are of such a Nature as to require all their Care, Judgment, Prudence, and

Assiduity, in *training up* their Children in the *right* and the *perfect* Way; particularly those Parents whose Children receive their Education at Day Schools.

When Children reside chiefly at Home, their real Dispositions can only be ascertained by those with whom they live and associate; it, therefore, becomes the imperative Duty of Parents to watch over, with a jealous, but an affectionate Eye, the Actions, Tempers, and Inclinations of their Children; and to give them the most prudent, kind, and judicious Advice, Instruction, and Information in their Power; and we really do not see how a Portion of the leisure Time of Parents can be devoted to more praiseworthy, better, or kinder Purposes.—Indeed, upon a proper Discharge of these parental Duties, depend much of the Welfare, Comfort, Prosperity, and Happiness of both Children and Parents; and the Care, Conduct, Example, Advice, Instructions, and Precepts of the latter, extend their Influence even beyond the Grave.

If Parents display Supineness and Inattention in the important Matter of Education, Children soon perceive it; and not having sufficient Experience to judge rightly of what will be of the greatest Advantage to themselves, they are thus taught, by the indifference of their Parents, to place little Value on Schools, Schoolmasters, Instructions, and Learning. Hence, the very best Efforts of the most able, diligent, judicious, and experienced Teacher may be completely counteracted and paralysed, for the want of corresponding Care, Attention, and Exertions in Parents, and by their neglecting to discharge their bounden Duties, in a proper and conscientious Manner to their Children.

Parents should strengthen the Hands of the *Schoolmaster*, in every way in their Power, by impressing upon the Minds of their Children, the Necessity and Advantages of Habits of Carefulness, Assiduity, and Docility; by assisting them with their Lessons, when necessary; by encouraging them to be diligent and persevering in the Pursuit of their Studies; but, above all, by making them attend duly and regularly to the Hours of the School.—This last neglect is a crying Evil against Parents; is very injurious to their Children; and most grievous to the conscientious *Schoolmaster*. If Parents only knew, and would consider the *great Advantages* resulting from these apparently trifling

Duties; they would eagerly seize every Opportunity of discharging them, to the great Benefit and Improvement of their Children.

Elder Sons and Daughters have received the first Aid, Care, and Attention of their Parents; and in return for such Kindness, it becomes their imperative Duty, to render every possible Support, Assistance, and Encouragement to the younger Branches of the Family. They should treat them with Tenderness and Affection; rectify their little Oversights and Mistakes, improve and enlarge their Judgment, extend and multiply their Ideas, assist and encourage them in their Studies; and afford them every Facility in their Power. Children should also endeavour and study to make easy and smooth, the declining Years of their Parents, by Acts of Kindness, Attention, and Affection; by a respectful, polite, and an obliging Deportment; by Reverence, Obedience, and Submission; by sympathizing with them in their worldly Disappointments; by assisting them in their Business and Pursuits; and by sharing in the Cares and lightening the Burdens that are inseparable from the Changes and Vicissitudes of Human Life.

We have often thought, during the Experience of Forty Years, that both Parents and Teachers commit most egregious Blunders, in expecting more from Children, than it is possible for them to perform, in Consequence of their Inexperience and tender Age.—All that we ought to look for, or expect from them, is a regular progress in Knowledge and Learning.—They ought, certainly, to learn something useful and beneficial every Day; and we ought often to put to them the following or some similar Questions.—Are you wiser this Evening, than you were in the Morning? Have you learned any Thing useful and beneficial during this Day?—Children are capable of answering such Questions, much better than is anticipated by the generality of Persons; for having acquired Knowledge, they feel it in themselves; and this being the Case, it would be very difficult to persuade them that they had, in this respect, made a Miscalculation. They know well, when they have made an Improvement, and they know equally well, when they have been careless and inattentive; and this any Person may easily prove to his own Satisfaction, by asking them various, judicious, and searching Questions.

We shall conclude our Observations to Parents, by the following beautiful Extracts from the *ECONOMY OF HUMAN LIFE*.

“PREPARE thy Son early with Instruction; and season his Mind with the Maxims of Truth. Watch the Bent of his Inclination; set him right in his Youth; and let no evil Habit gain Strength with his Years. Teach him Obedience, and he shall bless thee; teach him Diligence, and his Wealth shall increase. Teach him Science, and his Life shall be useful; teach him Religion, and his Death shall be HAPPY.”

HAVING made a few Observations on the Duties of Teachers and Parents, we now come to consider the relative Duties of Pupils; for they must be given to understand that all the Responsibility of their Education and Improvement does not rest or depend upon their Teachers, Parents, Guardians, or Friends.—

It is the Business, Duty, and Interest of Pupils to pay great Attention to the Instructions, Advice, and Admonitions they receive from their Teachers; to be diligent and persevering in all their Studies, both at Home and in School; to acquire Information by the careful Perusal of Books of General and Scientific Knowledge; and to improve themselves by following the Examples of their best and most diligent School Fellows.—They should love, honour, and obey their Parents, and be thankful to them, for all their Favours and Kindness; they should behave with Politeness and Respect to all Persons, but particularly to their Teachers; and they should discharge all their other Duties and Obligations in such a manner as to give Pleasure and Satisfaction to their Superiors.

If they have any Defect or Imperfection in their Temper, they should labour diligently to correct and improve it; they should endeavour to acquire Habits of Care, Diligence, and Industry; they should try to profit by all the passing Incidents and Occurrences of Life; and when they are at a loss in what Manner to proceed, they ought to ask the Advice and Assistance of their Parents, Teachers, and Friends.

To accomplish all this, we must acknowledge that it will require great Care, Attention, and Circumspection in our Young Friends; but if they will commence the Work, with a full determination that it shall be executed, they will very

soon find that it is more than half done ; for a good Beginning is generally crowned with ultimate Success.

When Pupils have brought themselves to a proper and desirable State of Mind, they will begin to perceive the unspeakable Advantages of a good Education ; and to feel the Pleasures of a well regulated Mind. They will begin to discover the difference between being *loved* and *disliked*.—They will learn to feel for the Happiness of others ; and be grateful to their Parents for the Protection and Solitude they have bestowed upon them.—They will begin to appreciate the Exertions of their Teachers ; first, by Gratitude for their Care and Instruction ; and next, by re-doubled Exertions to second their Efforts.—This State of feeling and acting will repay all the Anxieties of their Parents ; and will be a recompense to their Teachers, for Years of laborious Solitude, who will see and rejoice in the Work of their own Hands, Head, and Heart, in producing Knowledge, Rectitude, and Excellence in their PUPILS.

EXTRACTS FROM VARIOUS AUTHORS, RELATING TO THE
DUTIES OF PUPILS.

QUINTILIAN says, That he has included almost all the duties of Scholars in this one piece of advice which he gives them. To love those who teach them, as they love the Sciences which they learn of their Instructors ; and to look upon their Teachers as Fathers, from whom they derive not the Life of the Body, but that Instruction which is in a manner the Life of the Soul.

SENECA exhorts Young Men to preserve always a great respect for their Masters, to whose care they are indebted for the amendment of their faults ; and for having imbibed sentiments of Honour and Probity.

CICERO says, Who is their among us, that has been instructed with any care, that is not highly delighted with the sight, or even the bare remembrance of his Preceptors, and the Place where he received his Instructions.

MARCUS AURELIUS, one of the wisest and most illustrious Emperors that Rome ever had, thanked Heaven for two things especially ; for his having had excellent Tutors himself, and for having found the like blessing for his Children.

ALEXANDER THE GREAT used to say, That he was as much indebted to Aristotle his Master, for his Education, as he was to Philip his Father for his Existence.

ROLLIN says, That the duties of Scholars consist in docility and obedience ; respect for their Masters ; Zeal for Study ; and a thirst after the Sciences, joined to an abhorrence of vice and irregularity, together with a sincere and fervent desire of pleasing God, and referring all their actions to Him.

EXTRACTS FROM VARIOUS AUTHORS, RELATING TO THE
GENERAL EDUCATION OF YOUTH.

"THE EDUCATION of Youth being one of the most important Objects that can engage the Attention of Man; it ought, therefore, to be entered upon with mature Deliberation on the principal Objects which demand particular Attention, in every Instructor of Youth. These, it is presumed, may be classed under the three following Heads; namely, Health, Morals, and Instruction. Health being of the greatest importance, and the Basis or Foundation of the Rest; it should employ our first Cares, in Order to secure it, by a copious Supply of every wholesome Necessary of Life; and by an orderly Distribution of Time for Sleep, Meals, and Recreation."—DARBY ON EDUCATION.

"It is well known and universally acknowledged, that regular Exercise is of the utmost Consequence to corporeal Health and Vigour; that by it all the Organs and Senses of the human Body are improved and strengthened. Wherefore, as Children are passing from Infancy, through the state of Childhood, to that of Youth, let every Facility for Exercise be afforded them; let them be animated and excited to what is so beneficial, by Countenance and by Example.—This Care should be extended to the Season of Youth, in which Exercise is of equal, if not of greater Importance. Let Exercise be well regulated and made agreeable and attractive.—It is a matter of such Moment, as to be worthy of the Attention of Instructors.—It would, perhaps, be neither unwise nor unprofitable, were Exercise to be made a Part of the regular Business of Boarding-schools, and other Seminaries. Thus Health, Strength, Gracefulness, Activity, Relaxation from severer Studies, mental and bodily Renewal and Refreshment, might all be combined."—HORT'S ADVICE TO PARENTS AND TUTORS.

"As I have said so much in favour of study, and nothing concerning relaxation, I apprehend that you are, by this time, ready to exclaim, 'What! are we to have no play, no recreation?'—I answer yes; for I am well aware that health of body, and vigour of mind, cannot long be preserved without Exercise.—It is absolutely necessary that the minds of studious persons, should be frequently relieved by a change of studies, by a diversity of objects, by cheerful company, by innocent sports, and by harmless amusements. I do not even think that it is beneath Teachers to join in the childish diversions of their Pupils. This was the conduct of the *great and good* Addison towards his Pupil, the Earl of Warwick.—We also find that when *Æsop* was ridiculed for playing with boys, he soon exposed the ignorance of the censorious Athenian; and I do assure you that no less a man than Cicero commends his two friends, Scipio and Lælius, for amusing themselves with picking up cockle-shells on the sea-shore."—NESBIT'S ADDRESS TO YOUNG STUDENTS, 1817.

"THE first step in intellectual culture is, without doubt, the production of that state of mind which in relation to a Child, is emphatically Life and Health,—I mean *natural sprightliness*; the lively Eye, the quick Ear, the merry Countenance, the subdued, but still ever-buoyant Gladness which is the Birth-right, the lawful Inheritance of Childhood. This is beyond dispute, Nature's own and best preparative for future Acquisitions."—"The general principles of GOVERNMENT, it is scarcely

necessary to observe, are the same, whether applied to one Child or to a hundred. In either case, there must be unyielding determination, impartiality, uniformity, firmness, and mildness, on the part of the Teacher; and, unreserved and cheerful submission on the part of the Pupil. In both cases, obedience if not prompt and entire, is no obedience at all."—DUNN'S PRINCIPLES OF TEACHING.

"EDUCATION is the first of all means that men have adopted to secure themselves against the numerous evils to which they are exposed, both by nature and art; and for this reason, Education will always be a subject of the highest consideration to every rank of the Community; for all are desirous to avoid Evil and seek Good.—A good Education, is the plain and infallible road to Happiness; and a bad one must lead to Misery."—"It may be said, that although Teachers cannot constantly make the same Impressions upon the Senses of different Pupils, they may make impressions so nearly similar, that any differences may be neglected without altering the general principle of equality of Understanding, or equal Capability to receive Instruction.—It must be obvious to all, that Pupils of very different ages may be, and have been taught English Grammar, Arithmetic, Geometry, and other Branches of Knowledge. The trifling differences of capacities can be reduced, by the Skill of an experienced and judicious Teacher, to the same apparent level; so that the final effect upon all, may be nearly the same. It will be in vain, that any Teacher, or pretended Teacher shall deny this, because he himself has not been able to effect it. This is a matter of common experience to Good Teachers; and to deny it would be to deny that causes produce effects; or that the mind and the body are ready to be impressed by adequate forces.—If the Creator had not given a common Capacity to all Men, a common Understanding to all Nations,—Truth in Europe would be Falsehood in America."—HINE ON EDUCATION.

THE BEST WAY TO TEACH.

"It was once said, by an Eminent French Philosopher, 'That the best way to educate a child is to tell it stories, and let it tell stories to you.' There is so much true philosophy in this remark, that we will extend it a little. There is a school-room education, and an ambulating or walking education; the one is obtained out of the book on the bench, the other from walking among and talking of things. And, we believe that this out-door instruction has been too much neglected; education having been conducted on the principle of looking out of the window at things, instead of visiting objects, and learning their properties and uses. The student, for example, looking out of his college window at the horse, can give five or six names to the animal: one in Latin, one in Greek, another in German, and then the French name, &c. The stable-boy can give but one name; yet which knows the most of the properties, nature, disposition, and uses of the horse? Education consists too much in merely *naming* things, when it should relate more to their properties and uses. It should connect words with ideas, and ideas, as much as the nature of the subject will allow of, with objects. If we instruct children orally while visiting nature, words, ideas, and objects, will naturally be more in connection with each other, than the school-room lesson can make them. And, the Teacher should

take occasion to instruct in the fields, in ship-yards, in the crowded streets, and in the pathway of canals and railroads. He should talk on all these subjects, and elicit from the Children their own impressions, inquiries, and reflections. He should talk and walk, and let the Children talk and walk more, in the process of Education, than has been the Practice with the majority of Instructors."—CHAMBERS' EDINBURGH JOURNAL.

MAXIMS IN TEACHING.

"ALL TEACHING may and should be rendered pleasant and delightful.—No Severity, but as a Check to Idleness and improper Conduct.—Too much Gravity, Dulness, Dryness, and Formality will never effect much with Youth; they must be kept cheerful, and be induced to undertake Things with Pleasure, Spirit, and good Humour.—It is of the utmost Importance that Pupils should be encouraged and induced to do as much for themselves as possible; and in Order to accomplish this, they should be taught to have a high Opinion of their own Talents.—There is no certain Method of knowing whether a Pupil can solve his Question or not, but by *seeing* him work it; trial Sums must therefore be frequently given to each Pupil, as well as to the different Classes.—Never teach too much at a Time, it fatigues and discourages the Pupils; and go often over the same Rule, for Children are weak, and their Memories are seldom very retentive.—Make your Pupils independent of each other, and of yourself; they will love and respect you the more for your Exertions.—Never represent any Thing as difficult; there is Nothing difficult to diligent and attentive Pupils, and able and honest Masters.—Labour by all the Means in your Power, to give your Pupils a Love for Study, Learning, and Knowledge; otherwise they will perform their Duties with Carelessness and Inattention, and more like SLAVES than FREEMEN."—THE SCHOOLMASTER.

READING may very properly be styled the Key to all the other Sciences. If a Person be imperfect in his Knowledge of Words, he will find great Difficulty in committing any Thing to Memory; and still greater in comprehending its Meaning. He will invariably disgrace his Conversation by bad Pronunciation, and his Hand Writing by false Spelling; and, through the whole Course of his Life, must inevitably remain half excluded from the Book of Knowledge and the Light of Truth.

It is not, however, a mere Repetition of Words, nor even an Accurate and easy Delivery of the Subject, that constitutes a good Reader.—No; Care must be taken to give each Word its just Energy and Importance; to mark, by appropriate Tones and Inflections, every Change in the Subject; and to convey to the Hearer the full Sense and Meaning of the Writer. These are Qualifications which are pleasing to our best Feelings; are intimately connected with the reasoning Faculties of Man; demand the utmost

Endeavours of Young Persons to obtain them; and should always receive due Attention in every Establishment for the EDUCATION OF YOUTH.

EXTRACTS FROM VARIOUS AUTHORS.

"READING is not ill defined by Mr. Rice, in his Introduction to the Art of Reading; where he calls it Artificial Speaking.—The Art of Reading is that System of Rules, which teaches us to pronounce written Composition with Justness, Energy, Variety, and Ease. Agreeably to this Definition, Reading may be considered as that Species of Delivery, which not only expresses the Sense of an Author so as barely to be understood; but which, at the same Time, gives it all that Force, Beauty, and Variety, of which it is susceptible."—*Walker's Rhetorical Grammar*.

"THE Improvement of Pupils, in most Departments of Knowledge, depends, in a great Measure, on their Ability in Reading; and a more important Subject does not claim the Attention of a Tutor. In order to read with propriety, it is absolutely necessary to have a Knowledge of English Grammar. That Sentence will seldom be properly delivered, of which the Reader does not instantaneously perceive the Construction. But it is in conversation that a want of Grammatical Knowledge is most severely felt, by a sensible Mind."—*Goodacre on Education*.

"It has often been observed, and certainly not without sufficient reason, that very few persons read well! To read simply and naturally, with animation and expression, is indeed a high and rare attainment. The best readers are those who have most diligently studied their art; and studied it so well, that you do not perceive they have ever studied it at all. You so thoroughly understand, and so sensibly feel the force of *what* they say, that you never think for a moment, *how* they are saying it; and you never know the extent of your obligation to the care and labour of the Elocutionist."—*Dunn's Principles of Teaching*.

"THERE is, perhaps, nothing that has a greater tendency to decide favourably or unfavourably respecting a man's future intellect than the question. Whether or not he be impressed with an early taste for reading?—Books are the depository of every thing that is most honourable to man. He that loves reading has every thing within his reach. He has but to desire, and he may possess himself of every species of wisdom to judge, and power to reform.—Books gratify and excite our curiosity in innumerable ways. They force us to reflect; they present direct ideas of various kinds, and they suggest indirect ones. In a well written Book we are presented with the maturist reflections, or the happiest flights, of a mind of uncommon excellence; and it is impossible that we can be much accustomed to such Companions, without attaining some resemblance of them."—*Godwin*.

"It is of vast importance for the improvement of knowledge, that a young person should have the most proper books for reading, recommended by a judicious friend. In books of importance, I would advise that the preface be read, and a survey taken of the table of contents (if there be one,) before the first survey of the book. By this means you will not only be better fitted to give the book the first reading, but will

be much assisted in the second perusal of it, which should be done with still greater attention and deliberation. Unless a reader has an uncommon and most retentive memory, I may venture to affirm there is scarcely any book or chapter worth reading once, that is not worthy of a second perusal. Remember that your business in reading or in conversation, especially on subjects of natural, moral, or divine science, is to consider whether the opinions of the author or speaker are just; and to increase your own knowledge, by meditation on the subjects of their writing or discourse."—*Dr. Watts.*

"To read with propriety, is a pleasing and important attainment; productive of improvement, both to the understanding and to the heart. It is essential to a complete reader that he minutely perceives the ideas, and enters into the feelings of the author, whose sentiments he professes to repeat; for how is it possible to represent clearly to others, what we have but faint or inaccurate conceptions of ourselves? If there were no other benefits resulting from the art of reading well, than the necessity it lays us under, of precisely ascertaining the meaning of what we read, and the habit thence acquired, of doing this with facility, both when reading silently and aloud, they would constitute a sufficient compensation for all the labour we can bestow upon the subject. But the pleasure derived to ourselves and others, from a clear communication of ideas and feelings; and the strong and durable impressions made thereby on the minds of the reader and the audience, are considerations which give additional importance to the study of this necessary and useful art. The perfect attainment of it doubtless requires great attention and practice, joined to extraordinary natural powers; but as there are many degrees of excellence in the art, the student whose aims fall short of perfection, will find himself amply rewarded for every exertion he may think proper to make."—*Murray.*

ENGLISH GRAMMAR is the Art of speaking and writing the English Language with Accuracy, Propriety, Perspicuity, and Precision; and should form a prominent Feature in every System of Education. Indeed it is of such Value and Importance, that we cannot do without it, in the present refined State of Society; and it therefore claims the particular Attention of every Person who is desirous of speaking or writing with Elegance and Perspicuity.

Many excellent Grammars of the English language, are now extant; but Mr. Murray's Grammar, with his Exercise and Key, are generally considered to be far superior to any other Works that have been written on this Subject. He has not only furnished the Learner with his own Ideas and Sentiments; but has given copious Extracts from the Works of Harris, Johnson, Lowth, Priestly, Beattie, Sheridan, Walker, Coote, Blair, Campbell, &c., &c.

MR. NESBIT'S Treatise on English Parsing, adapted to Murray's Grammar, has been well received by the Public. This Work forms a Key to the First Part of Murray's Exercises; was highly approved by that Gentleman; and is considered, by competent Judges, to be the best Treatise on English Parsing, that has ever been published. It is equally well adapted for Public Schools, Private Tuition, and Self Improvement; and abounds with Explanatory Notes and Observations, which will be found of great Advantage to Learners in studying the English Language.

EXTRACTS FROM VARIOUS AUTHORS.

"THE Grammar of any Language, is a set of Rules and Observations, directing to the proper Use of such Words as compose that Language; and, in Order to our Improvement in polite Learning, we must, in the first Place, lay a solid Foundation in the Principles of Grammar."—*Joyce on Education.*

"Parsing is the Exercise of examining every Word of a Sentence; and declaring its Part of Speech, and all its Grammatical Relations and Circumstances."—*Blair.*

"Parsing is an Exercise of great Importance to the Pupil, and should be continued regularly through the whole Course of his Grammatical Instructions."—*Murray.*

"Diligent Parsing is an Exercise of the first Necessity. Without this Foundation, the Knowledge of a Language cannot be durable."—*Dr. Valpy.*

COMPOSITION is the Art of expressing the Conceptions of the Mind in Language appropriate to the Occasion. It is of the utmost importance in the Transactions of Life and Business, as Much frequently depends on the judicious Compilation of a Letter; besides, Knowledge, however various, and Genius, however brilliant, avail but Little, if their Result cannot be communicated with Clearness and Facility.

Young Persons generally find it very difficult, at first, to express their Ideas, on any Subject, with Propriety and Precision; but Practice soon renders this Task not only easy, but pleasing. Besides it brings into full and practical Operation, the different Parts and Rules of Grammar; shows their Application in the Construction of Sentences; and reduces to real Action, the Rules and Directions given by Murray, Walker, Irving, Blair, Ripplingham, &c., &c., for assisting Learners in English Composition.

The Classical English Letter Writer, published by Wilson and Sons, York; and Longman and Co., London; is an excellent Work on Epistolary Composition. It not only contains Introductory Rules, Directions, and Observations on the Art of Letter Writing; but, also a very judicious Selection from the Letters of Johnson, Pope, Cowper, Gay, Fenton, Beattie, Montagu, Nicholls, Seward, Doddridge, Hale, Gray, Jones, Horne, Smith, Temple, Hervey, Rowe, Carter, Cotton, Russel, Lyttleton, Warburton, Atterbury, Swift, Arbuthnot, Pitt, Hurd, Talbot, and several other eminent Writers.

The Classical English Letter Writer contains no Letters on Commercial Subjects; these, however, are abundantly supplied in "Nesbit's Practical Arithmetic," in which are given copious Rules and Directions for the Enditing of Business Letters. The Work likewise comprises Forms of Receipts, Promissory Notes, Bills of Exchange, and much other useful Information relating to Trade and Business, and other Commercial Subjects.

One excellent mode of acquiring a just taste for Composition, is to read those excellent *Moral Essays* which have periodically appeared in this Country in the course of the last and the present Century. The Spectator, Tatler, Guardian, Adventurer, Rambler, and Idler, together with other similar Productions, are entitled to no small Attention. Justly have they been denominated the *English Classics*.

These Works will enrich the Mind with a Variety of choice Sentiments; they will inspire Young Persons with Ideas of the Graces of Diction; and will teach them to distinguish between what is hollow and superficial, and that which is solid and just. Those who are ambitious of attaining a beautiful Style, ought to read and study, with great attention, the Works of our most eminent Poets. From this Source they will derive a more delicate and elevated mode of thinking, as well as of Expression.

Dr. Blair, in his Essays on Rhetoric, says, "Beauty of Writing, used in its more definite sense, characterizes a particular manner; when it is to signify a certain grace and amenity in the turn either of style or sentiment, for which *some authors* have been particularly distinguished. In this

sense, it comprehends a manner neither remarkably sublime nor extravagantly passionate, nor uncommonly sparkling; but such as excites in the reader an emotion of the gently pleasing kind, resembling that which is raised by the contemplation of beautiful objects in nature; which neither lifts the mind very high, nor agitates it to excess; but spreads over the imagination an agreeable and complacent serenity. Mr. Addison is a writer entirely of this character; and is one of the most proper examples which can be given of it."

Dr. Johnson, that Colossus of Literature, has given his unreserved commendation, to the Style of Mr. Addison, in the following words:—"Whoever wishes to attain an English Style familiar, but not coarse; and elegant, but not ostentatious, must give his days and nights to the volumes of Addison."

Dr. Knox, in his beautiful and valuable Literary and Moral Essays, says, "Addison, like Socrates, to whom he has often been compared, brought down knowledge from those heights which were accessible only to professed scholars, and placed it within the reach of all, who, to natural and common Sense, added the advantage of a common Education. He it was, who divested Philosophy of that unbecoming garb in which she had been disguised, by her mistaken followers; and represented her attired by the GRACES, like the GODDESS OF BEAUTY."

EXTRACTS FROM VARIOUS AUTHORS.

"THEY who are learning to compose and arrange their Sentences with Accuracy and Order, are learning, at the same Time, to think with Accuracy and Order."—*Blair*.

"The Importance of an English Education is now pretty well understood; and it is generally acknowledged, that for Young Gentlemen designed for Trade and Business, an intimate Acquaintance with the Properties and Beauties of the English Tongue, is a very desirable and necessary Attainment; and far preferable to a mere Smattering of the Learned Languages."—*Ash*.

"The English Language owes its Excellency to its being a Composition of nearly every other Language. The Beauties of almost every Tongue have been selected to grace our own; and with very few of the Defects of any, we possess the Charms of all. In Fact, it is Independent of any other; and is in Reality, the most concise and the most conformable to Nature, of any Language that was ever reduced to Rules."—*Smetham*.

"The principal Design of English Grammar, is to teach us to express ourselves with Propriety; and to enable us to judge correctly of every Phrase and Form of Construction. Indeed, a competent Grammatical Knowledge of our own Language, is the true Foundation upon which all Literature ought to be raised."—*Lowth*.

"A proper Construction of Sentences is of great Importance in every Species of Composition: it is the Foundation of good Writing, so that we cannot be too strict in our Attention to it. In any Subject, if the Sentences be perplexed, clumsy, or feebly expressed, it will not only disgust the Reader, but frequently destroy the Effect which the Writer intended to produce."—*Joyce*.

"It can hardly be necessary to demonstrate the Importance of the English Language, as a Study. Too much attention, surely, cannot be devoted to a Subject which not only forms the Vehicle of Thought; but is, in a certain Degree, the Instrument of Invention. That Writer, therefore, who freely contributes his Mite of Information, to the General Stock of Grammatical Knowledge, has some Title to the Regard of the Public."—*Grant*.

"Language is the Vehicle of Thought; the Medium through which we derive most of our Knowledge, and communicate it to others. Grammar is a Compilation or Collection of those Rules and Principles by observing which, we are enabled to render our Language clear and precise."—*Hiley*.

"Beauty of Composition tends to heighten the native Charms of Truth; it therefore ought never to be regarded as an Object of small Importance. The Mind is delighted with a fine Style, upon the same Principles that it prefers Regularity to Confusion, and Beauty to Deformity."—*Irving*.

"We are pleased with an Author, and consider him as deserving Praise, who frees us from all Fatigue of searching for his Meaning; who carries us through his Subject without any Embarrassment or Confusion; whose Style flows always like a limpid Stream, through which we see to the very Bottom."—*Murray*.

"The Importance of writing Letters with Propriety, justly claims to be considered with Care; since, next to the Power of pleasing with his Presence, every Man would wish to be able to give Delight at a Distance. This great Art should be diligently taught, the rather because of those Letters which are most useful; and by which the General Business of Life is transacted. It seems the usual fault of those who undertake this Part of Education, that they propose for the Exercise of their Scholars, Occasions which rarely happen; and neglect those without which Life and Business cannot proceed. On these Subjects, therefore, Young Persons should be taught to think justly, and to write clearly, neatly, and succinctly; lest they come from School into the World without any Acquaintance with Common Affairs; and stand idle Spectators of Mankind, in Expectation that some great Event will give them an Opportunity to exert their Rhetoric."—*Dr. Johnson*.

HISTORY is an Account or a Narration of past facts and events, relating to all ages and nations in the world ; and is equally attractive to the unreflecting and the philosophic mind. It interests and amuses the former by the stimulus of novelty ; and it is highly valuable to the latter, from the usefulness of the deductions which may be drawn from the facts and occurrences which it records. It is the common School of all Mankind, equally open to Princes and Subjects ; and it should therefore receive due attention in every Establishment for the Education of Youth ; and much of our leisure Time should be devoted to it, in riper and more mature years.

The Practical Use which may be made of History, constitutes one of its chief recommendations, as contrasted with Fabulous Romance ; because it presents us with the same objects which we meet with in the walks and business of life ; and it lays open to our view, many of the secret springs of action which influenced the conduct, and governed the transactions of Emperors, Kings, Princes, Statesmen, Politicians, Warriors, and other Public Men, who have figured and performed on this World's extended Stage.

History directs our attention, not only to modern, but also to ancient times. It exhibits to our view the rise of States, Kingdoms, and Empires ; their progress in Arts, Sciences, and Civilization ; the various Revolutions by which they have been agitated and convulsed ; and the causes which have occasioned their decline, ruin, and final annihilation.

It faithfully admonishes us, of the instability and uncertainty of all things human ; and teaches us that this World, and the fashions thereof, are passing quickly away.—What are become of the great and extensive Empires of the Assyrians, Babylonians, Medes, and Persians ? Where are now the proud boastings of Greece and Rome ; and where shall we find the superiority of Egypt, in the knowledge of the Arts and Sciences ?—Alas ! all these are fled, and, “ like the baseless fabric of a vision, have scarcely left a wreck behind.”

But it is not in these views alone, that History is useful.—It has been properly and emphatically called the “ Storehouse of Experience, the Mirror of Duties, the Source of Morality, and the Foundation of Conduct and Virtue.”—It unfolds

to us the Experience of Ages ; and introduces us to an acquaintance with the mighty and the illustrious Dead. It is the guide of the Statesman, and the favourite Study of the enlightened Scholar ; it is a Beacon to warn us of Shoals and Quicksands ; it is a Mirror in which we may behold the Fate of Nations ; and it is a Book in which Princes and People may learn their Duty to themselves and to the whole of Mankind.

WORKS ON HISTORY.

GOLDSMITH's Histories of England, Rome, and Greece, have long been popular Works ; and New and Improved Editions of the Abridgments have been published by different Booksellers.—We may also mention Pinnock's Easy History of England, for the Use of Young Persons ; Robinson's Ancient History ; Guy's Works on Ancient, Modern, and British History ; Bigland's Letters on Ancient and Modern History ; and also his History of Europe.—Besides these, there are many other small and useful Historical School Books, by various Authors. The larger Works on English History are those of Hume and Smollet, brought down nearly to the present Time.

We must not omit to notice particularly, a Number of Excellent Books, printed for the Proprietors of Publications on Christian Principles, and published by Hamilton, Adams, and Co., London ; and J. Y. Knight, Leeds ; under the following Titles : “History in All Ages.”—“History of the Jews, in all Ages.”—“Geography in all Ages.”—“Christianity in all Ages.”—“The Providence of God in all Ages.”—These Works contain a great Deal of most useful and valuable Information ; and are well adapted either for Private Reading, or for Class Books in Public Schools.—They are written on truly “Christian Principles ;” the Author every where acknowledging the FINGER OF GOD.

GEOGRAPHY is that Science which gives us a description of the Globe or Planet we inhabit ; and makes us acquainted with its figure, magnitude, divisions, productions, inhabitants, &c., &c. It unfolds to our view the various empires, kingdoms, states, provinces, and islands that are upon its surface ; describes the oceans, seas, lakes, and rivers by which they are watered ; and gives us an account of the manners, customs, religion, and commerce of the people who inhabit them.

It also notices the remarkable mountains that are situated in various parts of the world ; describes the seasons and climates of different countries ; the animals which inhabit them ; the lengths of the days and nights, and the times of their commencement, in different latitudes and longitudes ; narrates the discoveries of Travellers and Navigators ; and, it can only be properly studied in Schools, by the assistance of good Books, Maps, and Globes.

Without a knowledge of Geography, History cannot be clearly comprehended; we have but an imperfect idea of battles, sieges, and other remarkable occurrences, if we are ignorant of the place of action, or of the situation of that empire or kingdom in which they took place. Nay, we cannot understand even the pages of a common newspaper, without some knowledge of this Science.

To Mariners and Travellers, Geography is absolutely indispensable; and whoever is entirely ignorant of it, will cut but a very poor figure in company, as he must either be entirely silent on this subject, or betray his want of knowledge whenever he speaks about it.— Thus we see how necessary it is that this Science should by no means be neglected in the EDUCATION OF YOUTH.

WORKS ON GEOGRAPHY.

GUTHRIE's Geographical Grammar, and Pinkerton's Modern Geography, contain a Fund of Information on Geographical, Historical, and Chronological Subjects.—Pinkerton's Work has an Excellent Astronomical Introduction by the late Dr. Pond, Astronomer Royal.—We must also mention Brookes's Gazetteer, Walker's Gazetteer, Bourn's Gazetteer, Landmann's Gazetteer, The New London Gazetteer, Earnshaw's Pronouncing Gazetteer, Adams's Geographical History, Pye's Dictionary of Ancient Geography, Dr. S. Butler's Modern and Ancient Geography, and Lewis's Topography of Great Britain. Much Geographical Knowledge may be obtained by reading Voyages and Travels; they form a *never ending* Source of Amusement and Improvement.

On the Use of the Globes, we must notice Molineux, Butler, and Keith, all of whom have written excellent Works on this Subject.—The School Treatises on Geography, which we would recommend, are those of Keith, Goldsmith, John Guy, Joseph Guy, and John Hartley, all of which are good and useful Works; and well adapted for Learners.—We must likewise mention Ostell's General Atlas, Russel's General Atlas, Dr. S. Butler's Atlas of Modern Geography, and R. Buchanan's General Atlas, published by Boyd, of Edinburgh.

But, above all, we most strenuously recommend Johnson's School Room Maps, of the Eastern and Western Hemispheres; and of Europe, Asia, Africa, America, England, Scotland, Ireland, Canaan, and Palestine.—These Maps are admirably adapted for the Use of Schools; are mounted on canvass and rollers, and carefully coloured; measure four feet three inches by three feet six inches; and may be had, unvarnished, at Ten Shillings, or beautifully varnished, at Twelve Shillings each Map.—Or the whole Series, mounted in a case, on rollers, by which One Map can be exhibited at a Time, may be obtained at the moderate price of SIX GUINEAS.

CHRONOLOGY is the method of analyzing time, by dividing it into larger or smaller periods, as centuries, years, months, weeks, days, &c. It also takes a view of the

calendars of different nations; compares them together; and settles such order and harmony among them, that the time when any remarkable event took place, may be precisely known.

It is impossible to read History with much pleasure and advantage, without some knowledge of Chronology; for by it we are enabled to ascertain the time of the rise, decline, and fall of empires, kingdoms, and states; the periods in which Men of Eminence have lived and flourished; the times when remarkable battles and sieges took place; and many other occurrences that are recorded in both ancient and modern History.—The Sciences of Chronology and Geography, may very properly be styled the Eyes and Keys of HISTORY.

WORKS ON CHRONOLOGY.

Sir Isaac Newton, Sir John Marsham, Archbishop Usher, Dr. John Blair, Professor Playfair, and several others have written largely on the Subject of Chronology; but the best School Treatise with which we are acquainted, is Dr. Valpy's "Poetical Chronology of Ancient and English History."—W. Butler's Work entitled, "Chronological, Biographical, and Historical Exercises," also possesses great Merit; and is well adapted for the Improvement of Youth.—"The Tablet of Memory," shewing every Memorable Event in History, from the Earliest Period, to the Present Time, is likewise an excellent little Volume, containing a Fund of Information, on almost EVERY SUBJECT.—We also strongly recommend J. Haydn's Dictionary of Dates, and Universal Reference, as a Book of much Labour and great Merit.

BIOGRAPHY records the Lives and Characters of Eminent Men, both of ancient and modern times; and may be justly called the Science of Life and Manners. It teaches from Example; and is, therefore, well calculated to enlarge and improve our minds. It places before us the actions of Good Men, that we may imitate them; and it serves as a beacon to point out the rocks and sands upon which thousands have perished.

Biography appears to lay open the secret springs of Human Nature; and places before our eyes, not only the dispositions and characters; but also the actions of Kings, Princes, Statesmen, Warriors, Orators, Poets, Painters, Musicians, Philosophers, Mathematicians, and Divines.

By it we are informed of the inordinate ambition of Alexander and Cæsar; of the cruelties of Tiberius and Nero; of the legislative talents of Solon and Lycurgus; of the philosophy of Socrates and Plato; of the poetic talents

of Homer and Virgil; of the eloquence of Demosthenes and Cicero; of the skill of Diophantus and Euclid; of the medical attainments of Hippocrates and Boerhaave; of the discoveries of Linnæus and Pliny; and of the Works of the celebrated painters, Titian, Rubens, and Van Dyck.

We are likewise made acquainted with the christian fortitude of Cranmer, Ridley, and Latimer; with the deep penetration of Locke, Newton, and Boyle; with the critical powers of Addison, Johnson, and Blair; with the poetic fire of Milton, Dryden, Shakspeare, Thomson, and Pope; with the political abilities of Burke, Fox, and Pitt; with the hazardous voyages of Columbus, Anson, and Cook; and with the dangerous travels of Bruce, Campbell, and Park.

Biography also acquaints us with the musical talents of Handel, Mozart, and Haydn; with the architectural skill of Wren, Jones, and Rennie; with the fame of the celebrated painters Reynolds, Lawrence, and West; with the naval and military achievements of Duncan, Nelson, and Wellington; and with the abilities, courage, fortitude, perseverance, and discoveries of so many great and illustrious Characters, that we cannot here, even mention their Names.

Hence, we see that the Reading of Biographical Books affords a grand source of pleasure, amusement, and improvement to Persons of every rank and condition, from the King or the Queen upon the Throne, to the humblest Subject; and we, therefore, strongly and particularly recommend such Works to the Notice of BRITISH YOUTH.

WORKS ON BIOGRAPHY.

The following Works on Biography, we confidently recommend to our Young Readers, who will find in them abundance of Information, Amusement, and Improvement:—namely, Mavor's *British Nepos*; Mavor's *Plutarch's Lives*; Jones's *Biographical Dictionary*; Watkins's *Biographical Dictionary*, and his *Biographical Anecdotes*; Lempriere's *Universal Biography*; British *Plutarch*, by Archdeacon Wrangham; and *Plutarch's Lives*, by Archdeacon Wrangham.—Besides these, there are many other Works both of General Biography and of Single Lives; but those we have mentioned will be found quite sufficient for the generality of YOUNG PERSONS.

NATURAL HISTORY describes the productions of Nature; and it is divided into Three Grand Departments, called the Animal, the Vegetable, and the Mineral Kingdoms.

The first comprehends every thing that has life, as Man,

beasts, birds, fishes, reptiles, worms, insects, &c., and is called Zoology; the second describes all the different kinds of trees, plants, herbs, fruits, flowers, &c., and is known by the name of Botany; and the third treats of all ores, metals, and minerals that are dug out of the earth, and is denominated Mineralogy.

The greatest Princes and Philosophers have not deemed the study of Natural History unworthy of their attention.—Solomon, as the Scripture informs us, “Spake of Trees, from the Cedar Tree that is in Lebanon, even to the Hyssop that springeth out of the Wall; he spake also of beasts, and of fowl, and of creeping things, and of fishes.” “And, there came of all the people, to hear the Wisdom of Solomon, from all kings of the earth, which had heard of his Wisdom.”

It is of the utmost importance to exhibit to the Youthful Mind, a view of the Wonderful Works of God, in order to inspire exalted notions of his Divine Essence, Attributes, and Agency, in the formation and disposition of the Universe. This study is also pleasing, easy, and entertaining; and appears congenial to the natural disposition of Man, in every Stage of Life; but it is more particularly improving to Young Persons, as it lays open to their Views, the Wonderful and Extensive Field of Nature.

Few things can be more pleasing and improving to Youth, than to acquire a knowledge of the nature, properties, habits, and instincts of the Animal World; to become acquainted with the various properties and uses of trees, plants, and herbs, particularly as they are applied to building, dyeing, and medicine; to learn the values, qualities, and powers of all ores, metals, and minerals; to be informed of the different Countries in which they are found; and to be instructed concerning their various applications in the Practical Affairs of Life.”

WORKS ON NATURAL HISTORY.

ARISTOTLE, Pliny, Linnæus, Buffon, Goldsmith, Mavor, Bigland, Bingley, Akin, Thornton, and many others, have written copiously on the Subjects of Natural History.

Goldsmith's History of the Earth, and Animated Nature, in Six Volumes, octavo, is a valuable Work; and several New and Improved Editions, have lately been published, one of which is Edited by Dr. Turton, F.L.S.; and another by Captain Thomas Brown, F.L.S.—The Abridgment of Goldsmith's Work, and Mavor's and Bigland's Works, are very useful School Books.—Dr. Thornton's Family Herbal is also a very useful and a valuable Work.

Ray's "Wisdom of God, manifested in the Works of the Creation," is both a Religious and a Philosophical Treatise on Natural History; and cannot be too highly recommended to Youth.—A cheap Edition of this Book, was published, some years ago, by Dove, of London; and we hope, as a new Edition is much wanted, that it will speedily be reprinted.

EXTRACTS FROM VARIOUS AUTHORS.

"History is an account of past transactions, related with such important circumstances as are proper to be transmitted to posterity. This branch of literature is a noble accomplishment, and truly worthy of the study of a Gentleman. It will enrich his capacity with the valuable treasures of antiquity; and by leading him into the policy and customs, the religion and laws, the learning, and all the useful acquisitions of the ancient world, will teach him the experience of ages. It will show him the rise and decay of states, the methods which led to their glory; and the miscarriages which contributed to their FINAL RUIN."—*Guy's Cyclopædia*.

"History ought to be studied *With the Vigorous and Uniform Exertion of the Memory and the Judgment*,—the memory to recollect, and the judgment to estimate and arrange.—Without memory there can be no knowledge; and without judgment there can be no use of knowledge. If the memory does not retain, the mind is empty; if the judgment does not discriminate, the mind is confused. Judgment without memory, has no objects or facts upon which to exercise its power of discernment; memory without judgment preserves only a mass of uncombined and indiscriminate DISCORDANCE."—*History in all Ages*.

"GEOGRAPHICAL Inquiries are easy and interesting. Without some skill in Geography, it is impossible to read the historical parts of learning with any tolerable advantage. Chronology and Geography have been looked upon as the two eyes of History; if these shine dim, history must be a very obscure entertainment; without these helps it lies in confusion, is only a heap of indigested matter, flat and insipid; and will neither profit nor delight in reading; it is time and place that give LIFE as well as BEAUTY."—*Guy's Cyclopædia*.

"THE FUNDAMENTAL Principles of the Science of Geography, are of the greatest utility in the daily avocations of life. To be well acquainted with the general divisions of land and water; the sub-divisions of empires, kingdoms, and states; the names of places and their respective situations; is a branch of knowledge which it is impossible to want, without the self-conviction of the grossest Ignorance and Inattention."—*Dr. Mavor*.

THE STUDY of Geography, like that of History, exercises, in the most invigorating manner, the faculties of the mind; and furnishes a capacity, and provides a fund, for the importation of wisdom, of entertainment, and of pleasurable association with the living. Particular, and most momentous advantages, are subserved by the study of this science. It involves the knowledge of human nature, of human manners, and of human institutions; it affords information of inestimable value to almost every science which can be named; and it not only supplies literature with a boundless succession of feelings and of images, but it is essential

to the practical utility of every profession in human society—to the transactions of the merchant, to the enterprise of the mariner, to the operations of the warrior, to the plans of the politician, to the researches of the philosopher, to the exertions of the philanthropist, and to the investigations, to the dignity, and to the successful labours of the Ministers of Religion."—*Geography in all Ages.*

"HISTORY must be accompanied by Chronology, as well as Geography, or else we have but a very confused notion of it; for, it is not sufficient to know what things have been done, which history teaches us; and where they have been done, which we learn by Geography; but we must know when they have been done; and this is the particular Business of CHRONOLOGY."—*Chesterfield.*

"BIOGRAPHY is the art of describing or writing lives. It is a branch or species of history, more entertaining, as well as more useful in many respects, than even General History; as it represents great men more distinctly, unencumbered with a crowd of other actors; and, descending into a detail of a man's Actions and Character, gives more light into human nature, as well as excites us more to IMITATION."—*Guy's Cyclopaedia.*

"BIOGRAPHY appears to be more instructive than Civil History; although History has been called 'Philosophy teaching by Example.'—An exact and authentic account of Individuals who have greatly excelled in any of the departments of active or contemplative Life, seems to afford a mode of Instruction best suited to Man, who is generally prone to imitation. When a single Character is distinctly delineated, we can pursue every line with an ease equal to that with which a Painter copies from an original Picture placed before his Eyes.—It is a remark of Aristotle, that the story of an Individual, as it is a single object, is comprehended more fully, and therefore attended with greater pleasure, than a History in which many persons are INTRODUCED."—*Knox's Essays.*

OBSERVATIONS BY DR. MAVOR, ON THE STUDY OF NATURAL HISTORY.

"ANIMATED BEING is that branch of Natural History which possesses charms the most numerous and diversified, and is fraught with the most important consequences to Man; but this division of Nature cannot be comprised at a glance. It is advisable, that the Student should begin with examining the nature and qualities of such *Quadrupeds* as are most familiar to his observation. Even in the dog and horse, how many properties reside, which are hourly experienced, but seldom considered with attention! From such objects as are most obvious and inviting, he should gradually ascend by firm and patient steps, to the knowledge of others.

"The larger animals, and such as contribute to general pleasure and utility, will doubtless first engage his attention. After duly scanning their nature and instincts, their growth, their maturation, their increase, the care of their young, their selection of food, and the various means with which Providence has endowed them for their preservation, the Student should descend to an examination of such quadrupeds as are more minute, or retired from his notice; and, when he is tolerable well acquainted with those of his own country, should extend his views to the

natives of foreign regions. The sagacious docility of the elephant, the persevering fortitude of the camel, the generous magnanimity of the lion, and the savage fierceness of the hyæna and the tiger, will supply abundant materials for reflection, and incentives to further and closer investigation.

"Upon this acquaintance with the history of quadrupeds, the student should proceed to *Birds*, the most beautiful and most innocent tribes of the creation, and learn the means by which they are enabled to subsist either on land or water, the invariable structure of their nests according to their respective kinds, and the fond affection they display for their young. He will find that those birds whose beauty of plumage excites his admiration are generally destitute of harmonious voices; so that the parrot, the peacock, and pheasant disgust by their screams, while the homely lark, the nightingale, and blackbird delight by the sweetness of their melody, and captivate unseen.

"From the study of animated being, let the curious Student direct his attention to *Vegetables*; from vegetables to *Minerals*; and from the garnature or produce of the earth, to the celestial orbs that roll in the abyss of space; the planets in their regular courses, the comets in their eccentric orbits, and the myriads of fixed stars that adorn the vaults of Heaven. How amazing is the contemplation of the Universe! Wonders crowd on wonders; and the mind is bewildered, till it recurs to the Supreme, Universal Cause, and reposes on the Bosom of OMNIPOTENCE."

LOGIC is the Art of using reason well, in our enquiries after truth, and in communicating it to others. "Reason," says Dr. Watts, "is the glory of human nature, and one of the chief eminences whereby we are raised above the brutes, in this lower world."

Many Young Persons are quite alarmed at the word "Logic;" but it ought to be remembered that no more is implied by it, than the proper use of our intellectual faculties in distinguishing between truth and falsehood, right and wrong, and acting accordingly.

It is the very foundation of Composition; for if we do not make a proper use of our reasoning powers in arranging our ideas, how can we express ourselves in a clear and perspicuous manner!

Here it will be proper to observe, that truth, not victory, ought to be the ruling motive of all our debates with others; for nothing is so disingenuous, so unbecoming a gentleman, or any one who pretends to be a rational creature, as not to yield to sound reasoning, and the conviction of clear arguments.

Dr. Knox says, "To false and careless Reasoning most of the misfortunes of life are to be attributed; Logic as an Art, is therefore useful in the conduct of life, as it super-

induces a habit of accurate reasoning ; but it is only necessary to pay a moderate attention to it, because the improvements of Philosophy, and the great multiplication of Books, in every part of human Learning, enable the Student to spend his Time and exercise his Sagacity, more usefully and more agreeably, than poring, for years, over SYLLOGISMS and SOPHISMS."

The Systems of Logic, by Watts and Duncan, have been well received by the Public ; and any person who will give them a careful *Reading*, will greatly improve both his *Thinking* and his *Reasoning* POWERS. Locke's Conduct of the Understanding ; Watts's Improvement of the Mind ; and Mason's Self Knowledge, are all excellent WORKS.

LANGUAGES.

THE ENGLISH Language has been brought to such a State of Copiousness, Strength, Refinement, and comparative Perfection, that it is now entirely independent of any other Language ; and neither requires the Assistance of the Latin, the Greek, the French, or any other of either the Dead or the Living Languages.—As a proof of this, many of our best modern Publications have been written by Persons who know little or nothing of the Learned Languages ; and some of these Works can scarcely be surpassed, for Strength, Accuracy, Perspicuity, and Beauty of Style.

Our Language has been reduced to Regular RULES and PRINCIPLES, by the successive Labours of many Learned and Ingenious Writers ; among whom we may mention Dr. Johnson, Dr. Priestley, Dr. Dalton, Dr. Lowth, Dr. Ash, Dr. Blair, Dr. Coote, Dr. Campbell, Dr. Crombie, Dr. Irving, Mr. Horne Tooke, Mr. Walker, Mr. Knowles, Mr. Lennie, Mr. Hornsey, Mr. Smetham, Mr. Grant, Mr. Murray, and many others who have employed their Talents and their Pens, in improving, settling, and perfecting the English Language ; and it is now reduced to as much ORDER and REGULARITY, as either the Latin, the Greek, or any of the Continental Languages.—And, as Mr. Smetham very justly observes, "The English Language owes its Excellency to its being a Composition of nearly every other Language. The Beauties of almost every Tongue have been selected to grace our own ; and with very few of the Defects of any, we possess the Charms of all. In fact, it is

Independent of any other; and is, in Reality, the most concise and the most conformable to Nature, of any Language that was ever reduced to RULES."

Since the Time that Dr. Johnson wrote his valuable Dictionary, our Language has been very much improved, and amplified, by the Introduction of a Great Number of NEW WORDS, from the Latin, the Greek, the French, the German, the Italian, the Spanish, and other Continental Languages; and the Labours, the Research, and the extensive Reading of the Rev. H. J. Todd, have enabled him to enlarge and to enrich Dr. Johnson's Original Work, by the Addition of SEVERAL THOUSAND WORDS, forming in the Whole, the greatest Collection that has ever appeared in any ENGLISH DICTIONARY.

While we are on the Subject of the English Language, we must not forget to recommend to our Young Friends, Jones's Pronouncing Dictionary; the Union Pronouncing Dictionary, by Brown; and Walker's Pronouncing Dictionary.—The last Work is considered to be the STANDARD OF ENGLISH PRONUNCIATION.—Walker's Pronunciation of Greek, Latin, and Scripture Proper Names, is also a Valuable WORK.

LATIN, GREEK, FRENCH, &c.

LATIN AND GREEK.—In some of the Learned Professions, a Knowledge of Latin is absolutely necessary, as in Law, Medicine, Divinity, &c.; many valuable Works, and many ancient Records, having been written in this Language; and the Latin, Greek, and other Learned Languages, are certainly a great Accomplishment to Gentlemen of Independent Fortunes, who are thus enabled to devote sufficient Time to their Acquisition.

These Acquirements are of great Advantage, as they enable us to construe the various Mottoes and Quotations with which many of our best Authors have interspersed their Essays and other Writings; and upon which the whole Point and Beauty of a Paragraph frequently depend;—to decipher the Inscriptions which adorn the mouldering Dome, or the sculptured Monument;—and to translate the choice Sentiments that appear on the admonishing Dial.—To these we may subjoin the Pleasure of reading some of the most splendid Orations, and elegant Poems that ever issued from the Tongue or Pen of Man;—to enjoy their

Beauties, pure and unadulterated by Translation, are Advantages which can only be attained by a Knowledge of the Latin and Greek Languages.

THESE are a few of the Superiorities arising from a Knowledge of the Learned Languages; but it is now generally admitted by Men of both Learning and Experience in the Affairs of the World, that it is quite unnecessary for Boys to be versed in Latin and Greek, who are intended for Commercial Pursuits, or for General Trade and Business; and, indeed, much valuable Time is frequently spent, in acquiring a *Smattering* of Latin, that might be very advantageously employed in obtaining a thorough knowledge of the English Language, and in other necessary and useful Branches of Education, connected with the PRACTICAL AFFAIRS OF LIFE.

Besides, many Boys have neither Talent nor Taste for the Study of Latin; and would never make much progress, although they might be teased with it for years.—The Youth who is found to have a resolved Aversion to Latin and Greek, might be directed to other Branches of Science, in which he would take much Delight, and make the most rapid Progress.—Such a Boy may not have Abilities for a Lawyer, a Physician, or a Divine; but in some Branch of Trade or Business, adapted to his Inclination and Genius, he may be eminently successful, and may even eclipse many Boys of more brilliant Talents.

Much Stress has been laid on the Advantages of Learning Latin, in Order to know and trace the Derivation of Words, in the English Language; but it does not appear that this is of much Consequence to an English Scholar, as the Derivations of all our Words, may be found in Mr. Todd's Edition of Dr. Johnson's Dictionary.—Many of our Words are derived from the Saxon Language; and on the same mode of reasoning, we ought to study that Language, and this would lead us to the Study of the Gothic, as being the Parent of the Saxon; and thus we should reject the Refinements by which our elegant Writers, of the last and the present Centuries, have recommended the English Tongue to *universal* Esteem, and return to the Barbarous Phra-seology of our SAXON ANCESTORS.

EXTRACTS FROM VARIOUS AUTHORS.

"If Young Men have no Taste, naturally, for Latin, to *Force* it upon their Minds, only destroys the Truth and Simplicity of their Character;

and often prevents the Cultivation of many useful Talents, to which the Quality of the Soil may have been directly adapted."—*British Critic*.

"There is scarcely any Mind that will not be attracted by some particular Study; and such Boys as have an Aversion to the Learned Languages, are not unfrequently captivated with Mathematical Enquiries, or with the Problems of Mechanical Philosophy."—*Russell on Education*.

"The natural Disposition to any particular Art, Science, Profession, or Trade, is very necessary to be consulted in the Education of Youth; and there are many excellent Tempers, which are worthy to be nourished and cultivated with all possible Care and Diligence, that were never intended to be acquainted with Aristotle, Tully, or Virgil."—*Addison's Spectator*

EXTRACT FROM MR. MURRAY'S OCTAVO GRAMMAR.

"THE ENGLISH LANGUAGE has been so much indebted to others, both ancient and modern, that it must, of course, be very copious and expressive.—In these respects, it may be brought into Competition with any now spoken in the World.—No Englishman has had reason to complain since our Tongue has reached its present degree of excellence, that his Ideas could not be adequately expressed, or clothed in a suitable dress. No Author has been under the necessity of writing in a foreign Language, on account of its superiority to our own. Whether we open the volumes of our Divines, Philosophers, Historians, or Artists, we shall find that they abound with all the terms necessary to communicate their observations and discoveries; and give to their readers the most ample views of their respective subjects. Hence it appears, that our Language is sufficient for all topics, and that it can give proper and adequate expression to variety of argument, delicacy of taste, and fervour of genius. That it has sufficient copiousness to communicate to mankind every action, event, invention, and observation, in a full, clear, and elegant manner, may be proved by an appeal to the Authors, who are at present in the greatest ESTEEM."

FRENCH, &c.—"The Commercial Intercourse subsisting between different Nations, renders it absolutely necessary that each be acquainted with some language known to the other. In the present state of Europe, the French seems to have obtained the ascendancy, and to be used as the general medium of communication amongst the politer parts of the Continental States; but especially those adjacent to France.

"Independent of this convenience, the attainment of every Language, by employing the faculties of the mind in the investigation of sentences, tends to produce a greater knowledge of Universal Grammar; and, be it ever remembered, for the encouragement of the Grammatical Student, that, 'They who are learning to compose and arrange their sentences with accuracy and order, are learning at the same time, to think with accuracy and order.'

"In the study of a foreign Language, and especially one like the French, where the words are pronounced so differently from the manner in which they are written, a native Tutor, habituated from infancy, to the enunciation of his own language, is certainly preferable to an Englishman. This is not always deemed a matter of importance; but it will certainly appear so, if we consider for a moment, the impropriety of employing any of the best educated Frenchmen amongst us, to teach Children to read and pronounce our own Language."—*Goodacre on Education.*

MR. GOODACRE'S observations apply equally to the Italian, German, Spanish, and other Continental Languages; for the Grammatical Knowledge of one Language naturally leads to the Grammatical Knowledge of any other Language; the Parts of Speech, the Rules of Syntax, &c. &c., being very similar in all the refined Languages of Europe.—Here it may be observed, that the English Language is much more cultivated on the Continent at the present Time, than it was formerly; and that it is the General Language of Canada, and the whole of the UNITED STATES OF AMERICA.

EXTRACT FROM THE SCHOOLMASTER.

"THE FRENCH LANGUAGE is so extensively useful in our Interchange with Foreigners, that it is considered indispensably necessary for those who are intended for extensive mercantile Pursuits; it is, therefore, very generally taught, but seldom with the desired success.—This in a considerable degree, proceeds from the anxiety Parents express to hear their Children speak the language; imagining that it can be attained by conversation alone, with the same facility as their vernacular Tongue. But the modes of expression in the two languages are extremely different; and the Learner having become habituated to his own forms of construction, is continually adopting them, in his attempts to express the foreign Idiom. This fault can never be remedied without Grammar; the business of which is to point out the best usage, and to enable the student to discover every deviation from it, which can only be acquired by considerable Study and Practice."

EXTRACT FROM THE REV. W. SHEPHERD'S ESSAY ON EDUCATION.

"IGNORANCE and Presumption generally go hand in hand; and it is by no means an uncommon incident, that they, who in their native Country, never rose higher than to the occupation of Valets or Clerks, profess to imbue their Pupils with all the graces and elegancies of its Language. It is obvious, that from Instructors of this description, little can be learned but vulgarity and barbarism. A *faithful* and an *intelligent* Preceptor, however, may be of the greatest use. He will be enabled to attune the ear of his Pupil to a correct pronunciation. He will give him a relish for the best Authors of his native country. He will introduce him to a familiar acquaintance, not only with its histo-

rians and poets, but also with its more idiomatic, its comic, and its colloquial writers, whose phraseology will be an excellent guide; and will afford him much facility, in speaking their language. At the same time he will instruct him in composition; and qualify him for maintaining an epistolary correspondence in the language which is the object of his Study.

PENMANSHIP.

THIS BRANCH of Education is justly considered of great importance, in this Commercial Country; as few acquirements are of more advantage, to Men of Business, than that of writing a good current hand, with ease and expedition.—In order to become a proficient in this Mechanical Art, it not only requires considerable time, care, and perseverance in the Pupil; but also every assistance that can be rendered by the Master.

However, Writing, as it is usually taught, takes up much time to little purpose; and it might be supposed, that so much practice could not fail to produce excellence; but the contrary is generally found to be the case.—Indeed, from the common methods of teaching, it is not likely to be otherwise; and it cannot excite much wonder, that so many Copy Books are filled, without producing much Improvement; and that Boys frequently leave School quite incapable of writing a Hand that is fit for any kind of Business.

Beside, so much valuable time being needlessly spent in Writing, is a great drawback and disadvantage to the Pupil; three or four hours saved every week, for three or four years, would afford many opportunities of acquiring much practical and useful Information, on General Subjects of EDUCATION.

EXTRACTS RELATING TO WRITING.

"BEAR in mind, that your Pupil's success mainly depends upon the attention paid to him when *First Beginning* to write. It is then that habits are formed, which he will find it afterwards, almost impossible to alter.—Let not the Pupil attempt what is called 'small hand,' until he can write a good bold text hand, with Neatness and Accuracy."—*Dunn's Principles of Teaching.*

"IN MANY SCHOOLS, if the Pupil be at first shown how to hold his Pen, and his Writing, afterwards, seen once in the course of writing a Copy, that is all which is *generally* done for him; and when he begins to join his letters, he is left to proceed as he can."—"The Master may go round, during the time of writing, and say to each Boy, as he passes, 'Look at your Copy.'—'Take more Pains.'—'Keep your Book clean.'—'Why do you write so fast?'—And this is all the Instruction the Pupil generally receives from the Teacher!!"—*The Schoolmaster.*

DIRECTIONS FOR WRITING.

IN commencing Writing, the Pupil should use a Slate, as by this means he will much sooner learn to form the letters correctly, than at first, using Ink and Paper; and he should be taught to hold his Pencil properly, and in the same manner that he will afterwards have to hold his Pen. This is of great importance in the commencement; for incorrect habits formed at the beginning, are not easily eradicated.—The pencils should be finely pointed; and when they become too short, tin cases may be used with advantage.

The Pupil should first be taught to form all his letters with correctness and regularity; and with round, or more properly speaking, with fine oval turns, both at the top and bottom. The down strokes should be bold and strong, and the up strokes as fine as possible, resembling a Hair; hence, they are generally called "Hair-strokes."—All the downward strokes should lean or slant with a proper, graceful, and uniform angle.—Writers differ with regard to the quantity of this angle; but for common large hand, a slope, varying from 48 to 54 Degrees, forms a very good angle; and for small hand, the angle may range from 45 to 52 Degrees, according to the taste or pleasure of the Teacher.

A right angled triangle made of mahogany or any other wood, with its hypothenuse sloping at a proper angle with the base, should be used in drawing the first slant line, in the copy book; other parallel lines may then be drawn by a common ruler; and thus the Pupil will have a regular guide for leaning his writing.—Boys very soon learn to rule these lines for themselves; and are generally much pleased with them, as affording them considerable assistance.

In writing large, or what is commonly called text-hand, the upward or hair-strokes, should be carried out exactly at the middle of the down strokes, with a fine and gentle curve; but in small hand, they should proceed, in a beautiful curve, from nearly the bottom of the downward strokes. The Learner should be careful to keep equal distances between his letters, and also between his words; and generally speaking, it is much better to write pretty wide, than the contrary; as this gives both ease and freedom to the hand; and the writing does not appear so cramped, stiff, and formal.

The Capitals and long Letters should be written with true taste and elegance; the tops and bottoms of the looped

letters, should be of equal lengths; and they should be considerably extended, as this also tends to promote freedom of hand.—If the Pupil can acquire the method of writing his long letters with ease and accuracy, he will find no difficulty in making short tops and bottoms, when it is thought necessary to have the lines closer to each other.

Pupils should always have good and correct Copies placed before them; and they should never be allowed to imitate incorrect ones; as this would infallibly lead them into a bad style of writing.—Well and correctly *written* Copies, we prefer, particularly for Beginners; as they generally feel a greater emulation in imitating them, than they do when writing after Copper Plates.—Of the latter, however, many excellent ones have been published; amongst which we may mention those of Butterworth, Scott, Bradshaw, Findlay, Firth, and Smith.

At the commencement of writing, the Pupil should examine very minutely, every stroke, every turn, and every letter in his copy; and he should take much time, care, and pains, until he can form all the letters correctly. When he can accomplish this, he will soon acquire freedom and expedition, from regular practise; and by always endeavouring to make as many letters as possible, without lifting the Pen from the Paper.

Masters should carefully and regularly examine the *copy-books*, every two or three lines, as the Pupils are writing; and minutely point out their faults, by noticing the uneven and crooked letters, the square or pointed turns, the too slender down strokes, or the too thick up strokes, the want of uniformity in the size or shape of the letters, the unequal distances of the words, and every other irregularity; and thus, in a little time, the Pupils will not only be able to discover their own faults, but will be taught to judge of any style of writing, almost as well as their Teachers.

Ornamental Penmanship should by no means be neglected; thus Printing, German Text, Old English, and the Italian, and the Engrossing Hands should receive a moderate share of attention, both from the Teacher and the Pupils.—These Hands are both *useful* and *graceful*, in *directing* *Parcels*, *ornamenting* *Books*, *embellishing* *PLANS*, *MAPS*, &c., &c.

WE shall close our observations on Writing, with the

Directions given by Mr. Butterworth, in one of his Copy Slips, for acquiring a good and free Current or Running HAND.

Avoid lifting the Pen unnecessarily in Currency.

Be very attentive to your Capitals and long Letters.

Cautiously avoid writing after inaccurate Copies.

Direct your Attention wholly to Accuracy and Freedom.

Endeavour to write as fast as you can write well.

Freedom is soon acquired by striking frequently.

Guard against writing in a slow formal Manner.

Hold the Pen loosely, the Top pointing to the Shoulder.

Imprint on your Mind just Ideas of a Current Hand.

Keenly persevere in writing the Capitals with Taste.

Learn to keep your Words and Lines at proper Distances.

Make all your small Letters free and the same Size.

Neither sit too upright nor stoop ungracefully.

Often practise writing expeditiously upon a Slate.

Practise writing fast, to save Expence, on waste Paper.

Quick Writing is attained by seldom lifting the Pen.

Remember, to write quickly is of great Consequence.

Slow writing cannot answer in Dispatch of Business.

Take Care in writing quickly, to preserve Correctness.

Write frequently without lifting the Pen, philosophy.

EXTRACT FROM MR. NESBIT'S PRACTICAL ARITHMETIC.

"ALL Accounts, Bills of Parcels, Invoices, Receipts, Bills of Exchange, Letters, &c., &c., should be written in a good, free, commercial hand, completely devoid of that stiffness which is generally observable in the hand of a School Boy.--Young persons should endeavour to acquire this hand, before they leave School, by writing frequently, and quickly without lines; always taking care to make as many letters as possible, without lifting the Pen. Whole words may frequently be written in this manner, particularly such as *men, him, they, theirs, them, with, come, cheer, lime, time, lint, little, mount, mint, mutton, common, fluent, foment, finite, flutter, fulness, and, land, hand, find, mind, kind, flood, florid, almond, confine, commend, composed, compound, &c., &c.* By this means the letters will be joined to each other; for with the exception of bad spelling, nothing appears more ridiculous than for persons to write a *stiff, broken* hand, who have had a good Education.—They should also labour to obtain dispatch in making out Bills, and casting Accounts; as this will be found of great advantage, when they have to perform these operations, in Shops or Counting-houses, on the *Spur* of the Moment."

NOTE.—"In writing a *running hand* the *dees*, in the middle, and at the end of words, are most easily made, and look most *free*, when their *tops* are *thrown* or *struck*, with a loose and careless hand."

MATHEMATICS.

MATHEMATICS have been defined by some Writers, "The Science of Quantity;" but it is more properly the Science of Ratio; for it is not the Quantities themselves which are the Subjects of Mathematical Investigations, but the Ratio that different Quantities of the same Kind, have to each other.

In Fact, this Science is a Methodical Concatenation of Principles, Reasonings, and Conclusions, always accompanied by Certainty, as the Truth is always evident; an advantage that particularly characterizes accurate Knowledge, and the true Sciences, with which we must never associate Conjectures, or even Probabilities.

The Subjects of Mathematics are the Comparisons of Magnitudes; as Numbers, Distances, Velocities, Powers, &c., &c.—Thus Arithmetic treats of the relative Values of Numbers; Geometry, considers the relative Magnitudes or Extensions of Bodies; Astronomy, the relative Distances and Velocities of the Planets; and Mechanics, the relative Powers or Forces of different Machines, &c., &c.; in all Cases, some determined Quantity being first fixed upon, as a Standard of Measure.—Quantity expressed by Numbers, is called ARITHMETIC; but when expressed by Numbers, Letters, Signs, and Symbols, it is denominated ALGEBRA.

THE SCIENCE OF MATHEMATICS is divided into a Number of different Branches, as Arithmetic, Geometry, Mensuration, Gauging, Land Surveying, Trigonometry, Navigation, Astronomy, Algebra, Fluxions, Mechanics, &c., &c.—Each of these Branches has its particular Use; and is called into Requisition in conducting the various Departments of the Practical Affairs of Civilized LIFE.

We shall make a few General Observations on each Branch of the Mathematics; and refer our Readers to the Works mentioned at the End of this Essay, in which they will find all the PRINCIPLES and PROPERTIES clearly *laid down*, and fully *explained* and *illustrated*; with ample Directions for their Practical Application to the various Purposes of LIFE and BUSINESS.

These Valuable and Scientific Works have been written by Men of the First Rate Talent and Abilities; and to our Honour as a Nation, chiefly by our own Countrymen; and whoever will make himself Master of these Works, or even of a Part of these Works, may not only become a useful and

an honourable Member of Society, but will *rank high*, as a MATHEMATICIAN, and as a PHILOSOPHER.

GENERAL OBSERVATIONS.

ARITHMETIC treats of the Nature and Properties of Numbers; and the various Methods of performing Calculations by them.—An *Accurate* and a *Practical* Knowledge of this Science, is required in all Trades and Professions; and it is the Basis and Foundation of every other Branch of the Mathematics.

BOOK-KEEPING being a Branch of Arithmetic which is of great and vital Importance, in this Commercial Country; every Exertion should be made to explain and elucidate its Principles and its Practice, in the most clear and perspicuous Manner; particularly as relates to the Nature of Debtor and Creditor, Interest Accounts, Commission, Discount, Profit and Loss, Current Accounts, Exchanges, &c., &c.

Some Merchants do not wish their Sons to study any System of Book-keeping at School, but rather choose to have them instructed in their own Counting-houses; yet we are of Opinion that it is an excellent Method to Let Young Men go through a regular System of Merchants' Accounts, previously to the completing of their Education.

If a Pupil be properly instructed in School, and made fully to understand Dr. Kelly's Work, or Mr. Morrison's, or any other good modern Treatise on the Subject, he will be able to *Form Sets of Books* for himself, to suit his own Business; and will very readily comprehend any of the various systems of Book-keeping that may be practised in different Counting-houses; as all these systems have the same Basis; and they all tend to the same Object; namely, that of exhibiting the TRUE STATE OF A MERCHANT'S AFFAIRS.

The chief objection raised, by Commercial Gentlemen, against *School-room Book-keeping*, is the imperfect manner in which it is frequently taught; namely, by directing the Pupils first to copy, *verbatim*, the Waste Book, afterwards the Journal, and lastly the Ledger; instead of carrying all these Books on at the same time, making all the necessary calculations, *Journalizing* from the Waste Book, *Posting* from the Journal, and then *Balancing* each Account properly, in the Ledger, as it is done in Real Business.

It may be of some advantage for Young Teachers to be reminded, that the Journalizing and Posting should always be performed on slates, or on waste paper, previously to making the entries in the Books; as this gives the Master an opportunity of instructing his Pupils in a proper manner, and prevents many mistakes that will otherwise take place in performing these OPERATIONS.

GEOMETRY and MENSURATION are in great Requisition in the Science of *Mechanics*; and a perfect Knowledge of these Branches must be obtained by all Persons who are designed for Engineers, Architects, Timber Merchants, Builders, Carpenters, Joiners, &c., &c.; and indeed, if every Person dipped more into Mathematics, they would find an Advantage; for what Trade, Business, or Profession can be carried on without some Knowledge of Geometry and Mensuration?—Here we may observe that Euclid's Elements of Geometry is the oldest Work that has been brought down to the present time; he flourished about 300 Years before the Christian Era.

GAUGING is absolutely requisite in the Excise and Customs ; and it is also wanted by Maltsters, Brewers, Distillers, Rectifiers, Spirit Merchants, Wine Merchants, Inn Keepers, Victuallers, Vinegar Makers, Cyder Makers, Soap Makers, Starch Makers, Glass Makers, &c., &c. ; and as this Science is required in so many Trades, would it not be advisable for every Young Person to obtain a Knowledge of it ; as no one knows what Situation he may be called to fill in his Passage through LIFE ?

LAND SURVEYING is of extensive Use in ascertaining the Quantity of Land, and of Course the value of Land ; for without Measurements, neither the Occupier nor the Owner would be able to come to any Negotiation. Therefore, this Science ought to be Studied at School, by all those who are designed for Land Surveyors, or who expect to become Stewards to the Proprietors of Land, and particularly Stewards to Noblemen.—The Science of Land Surveying is also of great Advantage to Farmers, and to all Agriculturalists.

PLANE TRIGONOMETRY is of great importance in almost every Branch of the Mathematics ; but particularly in Land Surveying, measuring Inaccessible Heights and Distances, &c., &c. ; and it also forms the Introductory Part, or more properly, the very Basis of Navigation.

NAVIGATION in this Country of Ships, Colonies, and Commerce, is not only of paramount Importance, but absolutely necessary for all those who are designed to conduct our Vessels through the Trackless Deep, to far distant Shores ; and it ought, therefore, to form a leading feature in the Education of all Persons who are intended for a MARITIME LIFE, or who have Time and Leisure to devote to SCIENTIFIC PURSUITS.

SPHERICAL TRIGONOMETRY is the Science which treats of the Properties and Relations of Spherical Triangles ; and of the Methods of determining their Sides and Angles.—This Science leads us on to Practical Astronomy, or the Resolution of Astronomical Problems, which chiefly relate to finding the relative Situations and Positions of the Heavenly Bodies with Respect to each other ; and it is required in both Geography and Navigation, as well as in Astronomy.

By this Science, we find the Latitudes and Longitudes of Places on the Earth's Surface, and thus we are enabled to give greater Accuracy to our Maps and Sea Charts ; and accommodate both the Geographer and Navigator.—Mr. Emerson says, " Navigation depends upon Trigonometry.—Surveying and Dialling owe their greatest exactness to it.—It is of singular Service in Military Affairs.—The very Foundation of Practical Astronomy.—And furnishes us with the only correct Methods of determining the Geographical Distances of Places on the Earth ;—and their several Positions with respect to each other."

ASTRONOMY is a Mixed, Mathematical and Philosophical Science, which treats of the Heavenly Bodies ; their Motions, Distances, Dimensions, Magnitudes, Orders, Periods, Orbits, Revolutions, Oppositions, Conjunctions, Eclipses, &c., &c. ; and investigates the Causes, Principles, and Laws by which their Motions and other Phenomena are produced and regulated.—This is a Wonderful Science, and particularly displays the Wisdom, the Power, and the Goodness of the ALMIGHTY DESIGNER of the UNIVERSE!!!

ALGEBRA is a General Method of resolving Mathematical Problems, by Means of Equations ; and by its Aid, Solutions may be obtained

to Questions that could not be answered by any other Method ; hence, Sir Isaac Newton gave it the Appellation of "Universal Arithmetic."—Diophantus, who flourished about the Year 350, of the Christian Era, is the oldest Writer that we have on the Subject of ALGEBRA.—His Work is particularly noted for those curious and abstruse Questions relating to square and cube Numbers, and rational right angled Triangles, generally called "Diophantine Problems."

FLUXIONS may very properly be denominated a Refined, a Sublime, and an Infinite Species of Algebra ; and was first invented by Sir Isaac Newton, about the Year 1665, when he was only Twenty Three Years of Age.—By this Science, many Difficulties, insurmountable by any other known Method, are solved with uncommon Ease, Elegance, and Expedition.

It is a GENERAL WAY for determining the MAXIMUM and MINIMUM of Quantities ; drawing Tangents to Curves, finding their Points of Inflection and Radii of Curvature ;—for obtaining the length of Curve Lines, the Areas of curvilinear Spaces, the Surfaces and Solidities of concave and convex Bodies, &c., &c.—In a Word, it extends to the investigation of the most abstruse and difficult Problems in the various Branches of Mechanical, Mathematical, Astronomical, and Philosophical SCIENCE.

MECHANICS is that Branch of Practical Mathematics, which treats of Forces and moving Powers ; of their Nature, Laws, Velocities, Actions, &c., &c. ; and of their Effects upon other Bodies, either with or without the Intervention of Machines.—The Theory of Mechanics, next to that of Geometry, is justly reckoned the most certain ; as it proposes the fewest Properties of Matter, as Objects of Contemplation.

A Machine, in a general Sense, signifies any Thing that is used to augment or to regulate the Velocity of moving Powers ; or it is any Instrument employed to produce some Effect or Motion, in order to save either Time or Force.—As Machines are constructed for a vast Variety of Purposes ; their Forms, Sizes, Powers, Velocities, and Kinds of Movement, must depend upon their intended Uses, or Applications.

A Machine may be very simple or exceedingly complex ; thus, a Pin is a Machine, for fastening Clothes ; and a Steam Engine is a Machine, for propelling Mills, Boats, Carriages, &c., &c.

IN MECHANICS, there are a few Simple Machines, called "The Mechanical Powers ;" and however mixed or complex a Combination of Machinery may be, it consists only of these individual Powers.—There are commonly reckoned *Six Mechanical Powers* : They are the Lever, Wheel and Axle, Pulley, Wedge, Inclined Plane, and Screw. And, with Respect to the Principle on which they act, they may all be resolved into two Simple Powers ;—namely, the LEVER and the INCLINED PLANE.

THE SCIENCE OF MECHANICS embraces such a wide Field, and is applied to so many Useful and Practical Purposes, that to attempt the Enumeration of them all, would be an endless Task.—Every Instrument that is put in motion either by the Power of Men, Horses, Wind, Water, Steam, or any other moving Force, is a Machine, adapted and applied to some particular Purpose, either in the Arts of Peace, War, Agriculture, Manufactory, or Commerce.

A First Rate Ship of War, is a gigantic Machine, for offensive or defensive Operations; and the Largest Steam Engine is a Machine of amazing propelling Power; but what an infinite Number and Variety of excellent and useful minor Instruments, occupy the Space between these two mighty and major Instruments!!!

Archimedes had proved the Practical Power of Mechanics to such an Extent, and had produced such wonderful Effects with his Machines, that he exclaimed to King Hiero, "Give me a Place to stand on, and I will move the Earth"!!!—This great Mathematician, Philosopher and Mechanist, flourished about 210 Years before the CHRISTIAN ERA.

NATURAL PHILOSOPHY.

NATURAL PHILOSOPHY, or PHYSICS, is a very comprehensive Term; and implies the Study of Nature, in almost all its Departments and Ramifications.—This Branch of Science derives its Data from Experiments and Observations, on which the whole System is supported; and hence it is sometimes called Experimental Philosophy.—It treats of the Doctrine and Phenomena of Natural Bodies; their Properties, Causes, Effects, Velocities; and their various Affections, Motions, Powers, Operations, &c., &c.

Natural Philosophy is divided into a Number of different Branches; as Astronomy, Mechanics, Chemistry, Optics, Pneumatics, Statics, Dynamics, Hydrostatics, Hydraulic, Acoustics, Electricity, Galvanism, Magnetism, Electro-Magnetism, Mineralogy, &c., &c.

Astronomy and Mechanics have been already noticed, at considerable Length, as being very important and leading Branches of Natural Philosophy; we shall now simply give a Definition of each of the other Departments; mention a few of their Properties; and leave the Development of their Principles to Works written professedly on the various Subjects. (*See the Works on Natural Philosophy, mentioned at the end of this ESSAY.*)

GENERAL DEFINITIONS.

CHEMISTRY is that Department of Physical Science, the Object of which is to investigate and account for the intimate Changes produced in all Bodies in Nature, by the mutual Action of their Parts upon each other; by Means of which their Physical Properties are altered, and their Individuality destroyed.—This Change is generally effected by means of *Heat*, or by the *Mixture* of some other Matter with the Substance intended to be examined; and thus we are enabled to discover the peculiar Properties of all Natural Bodies, either in their simple or Compound State.

In the present State of Society, the Study of Chemistry is of the

greatest Importance; and should therefore be made a Leading and Methodical Branch of Education in every Seminary.—A Knowledge of its Principles is not only required in Dyeing, and Calico Printing; but also, in Bleaching, Tanning, Malting, Brewing, Distilling, Agriculture, Medicine, &c., &c.

The Science of Chemistry is likewise called into Requisition, in the Arts of refining Sugar, making Soap, Starch, Vinegar, Wines, Bread, Earthen-ware, Porcelain, Paper, Salts, Saltpetre, Alum, Copperas, Vitriol, &c., &c.; but particularly in the Smelting of Iron, Copper, Lead, Tin, &c., &c.; and also in the methods of obtaining Platinum, Gold, Silver, Zinc, and other Metals.

OPTICS is that Branch of Natural Philosophy which treats of the Theory and Powers of Vision; of the Nature, Properties, and Phenomena of Light; and of the various Changes which it undergoes in its Qualities, or in its Direction, when passing through Bodies of different Shapes, or Mediums.

This Science involves some of the most elegant and important Branches of Natural Philosophy.—It presents us with experiments which are attractive by their Beauty, and which astonish us by their Novelty; and, at the same Time, it investigates the Principles of some of the most useful Articles of Common Life.

Among these, we may mention, the valuable and indispensable Instruments called SPECTACLES, which can be made either *concave* or *convex*, to suit the Nature and Formation of all EYES, and every construction of Vision; Mirrors or Looking Glasses, either *plain*, *concave*, or *convex*; Burning Glasses; *Single* and *Double* Microscopes, *refracting* and *reflecting* Telescopes; Magic Lanthorns, Camera Obscuras; Glass Prisms for showing the Properties of Solar Light, and the Origin and Nature of Colours, &c., &c.

THAT BEAUTIFUL ARCH which we sometimes see in the Heavens, called the "Rainbow," is formed on optical Principles. The Solar Rays, entering the Drops of falling Rain, are refracted to their further Surfaces, and thence, by one or more Reflections, are transmitted to the Eye. At their emergency from the Drop, as well as at their Entrance, they suffer a Refraction, by which the Rays are separated into their different Colours; and thus they are exhibited to an Eye properly placed to receive them.—This is evidently the true Principle; for a Bow is never seen, but when Rain is falling, and the Sun is shining at the same Time; and the Sun and the Bow always appear in opposite Quarters of the Heavens.—The Ancients could not account for the Phenomenon of the Rainbow; this was left to be accomplished by the ILLUSTRIOUS NEWTON.

PNEUMATICS is that Branch of Natural Philosophy which treats of the Weight, Pressure, Elasticity, Transparency, &c., of elastic Fluids; but more particularly of the Nature and Properties of Atmospheric Air, in which we *live*, and *move*, and have our *Being*. The Uses of the Atmosphere are so many and great, that it is absolutely necessary, not only to the Comfort and Convenience of Mankind, but even to the Existence of all animal and vegetable Life.

Experiments, which have been frequently made, with an Instrument called an *Air Pump*, place it beyond doubt, that without the Air or Atmosphere, no Animal could exist, or even be produced:—without its Aid, all Vegetation would cease; neither would there be any great Degree of either Inflammation or Combustion.—Sound could not be produced without it; nor would there be either Rains or Dews to moisten the Ground:—in short, all our Reflections on the Atmosphere, will tend more clearly to convince us, that we continually stand in need of the Superintendence of our all-wise CREATOR.

THE AIR PUMP is a Pneumatical Instrument by which we can prove the Gravity or Weight of Atmospheric Air; its compressibility, its Expansibility, its Elasticity, and many other of its Mechanical Powers and Properties.—We can also demonstrate the Principles upon which Water Pumps, Fire Engines, Air Guns, Barometers, &c., &c., are constructed; and exhibit many other pleasing and improving Experiments.

The Barometer, or Weather Glass, is constructed on the Principles of Atmospheric Pressure.—This well known Instrument being calculated and designed to ascertain the Weight of the Atmosphere; we can, from this *Datum*, form more than a mere Conjecture of the probable Changes in the Weather.—Barometers are also used in finding the Altitudes of Mountains; for with them, assisted by Thermometers, this can be accomplished with more Ease, Accuracy, and Expedition, than by any other Method.

But, perhaps, one of the greatest and most valuable Uses of the Barometer, is on Board of Ships; where this LITTLE INSTRUMENT is frequently the means of preserving many a fine Seaman from a premature and watery Grave.—Here it is employed to indicate the Approach of Storms; and thus to give an Opportunity of preparing accordingly, by furling the Sails, and making other necessary Arrangements.—It is found that the Mercury suffers a most Remarkable DEPRESSION, before the Approach of violent Winds and Hurricanes.—The watchful Captain, particularly in Southern Latitudes, is always attentive to this *Monitor*; and when he observes the Mercury to sink suddenly, takes his Measures, *without Delay*, to meet the approaching TEMPEST.

STATICS is that Branch of Mechanics which treats of the Equilibrium, Weight, Pressure, &c., of solid Bodies, when they are at Rest.

DYNAMICS is the Science of moving Powers, or of the Action of Forces on Solids, when the Result of that Action is Motion.—These two Branches appear to embrace, nearly the whole Science of Mechanics, both Theoretical and Practical.

They take into Consideration and Calculation, the Centre of Gravity of Bodies, or any System of Bodies; their Weight, Inertia, Pressure, Equilibrium of Powers, Composition and Resolution of Forces, Generation and Communication of Motion, Velocities of moving Bodies, their Momentum or Impetus, &c., &c.—All these Subjects relate to the Construction and Application of the various Machines used in the Practical Affairs of Life and Business.

HYDROSTATICS is that Branch of Mechanical Philosophy which relates to the Pressure, and Equilibrium of non-elastic Fluids; and that of the Weight, Pressure, Stability, &c., of Solids immersed in them. A Fluid, or a Fluid Body, is that whose Parts yield to the smallest Force impressed

upon them, and by yielding, are easily moved among each other; in which Sense it stands opposite to a Solid, whose Parts do not yield, but constantly maintain the same relative Situation.

HYDRAULICS or **HYDRODYNAMICS**, is that Branch of **Mechanics** which treats of the Motion of non-elastic Fluids; but more particularly Water. It investigates the Laws which regulate its Motion; the Power or Force resulting from such Motion, whether the Water acts by Impulse or Pressure; the Effects produced on other Bodies, by its Action; the Friction arising between Water and Solid Bodies, &c., &c.

This Science is applied to finding the Velocity of Water, through Canals, Rivers, and Pipes of various Dimensions; the Velocity with which Water is discharged through Orifices made in the Bottoms or Sides of Vessels, producing what is generally called, "Spouting Fluids;" the Distances to which Water is projected on the horizontal Plane, from the Sides of Vessels; the Times in which Vessels will empty themselves, by Apertures in their Bottoms; the Quantities of Water which will be discharged through Canals, Rivers, or Pipes, in given Times, &c., &c.

ACOUSTICS is that Branch of Natural Philosophy which treats of the Origin, Propagation, and Effects of Sound; and of the Art of assisting the Sense of hearing by Means of Speaking Trumpets, Hearing Trumpets, Whispering Galleries, &c., &c.

When a sonorous or sounding Body is struck, it is thrown into a tremulous or vibrating Motion, which is communicated to the Air that surrounds us. By the Air, the vibrations are conveyed to our Ear-drums, which also undergo a vibratory Motion; and this Motion, throwing the auditory Nerves into Action, we thereby gain the Sensation of Sound.

The Atmosphere which surrounds us, is the Medium by which Sound is conveyed to our Ears; and to its vibrations we are indebted for the Sense of hearing, as well as for the Pleasure we enjoy from the **CHARMS OF MUSIC**.

AN ECHO is a reflected Sound, from some solid Body, returned or repeated to the Ear; and always produces a pleasing, and rather an astonishing Sensation, particularly in those Persons who have not been accustomed to hear Echoes.

Sound is propagated in every Direction, by the Vibration of the Particles of the Air; but if any Column of Air rests against some Obstacle, as a Building, a Wood, a Hill, or a Rock, that prevents the direct Movement of the elastic Globules, which serve as the Vehicle of Sound, it must rebound in a contrary Direction; and striking the Ear, produces an Echo, or a Repetition of the same Sound.

Some Echoes will repeat only one Sound; and others will repeat several Words in succession.—At Hackness, near Scarborough, there is an Echo that will repeat the five Vowels, A, E, I, O, U, with great Distinctness.—There is also a remarkably fine Echo under the Menai Bridge, which joins the County of Caernarvon to the Island of Anglesea.

There are likewise many beautiful Echoes in different Parts of Derbyshire; but particularly one at the Foot of Mam Torr, near Castleton. This Echo reverberates the Sound of a Pistol, among the neighbouring Hills, until it resembles the Rolling of a **PEAL OF THUNDER**.

At Milan, in Italy, there is an Echo which reiterates the Report of a *Pistol 56 Times*; and if the Report be very loud, upwards of 60 Reitera-

tions may be counted. The celebrated Echo at Woodstock, in Oxfordshire, repeats the same Sound 50 Times. A pleasing but surprising Effect is produced in the Whispering Gallery of Saint Paul's Cathedral, when the Door is closed with great Force; but we are not able to state what Number of Repetitions are given by this ARTIFICIAL ECHO.

Every Person must have remarked that Bells are often heard as if they were in a Situation different from their real one; on the left for instance, when they are really on the right; this arises from the direct Sound being intercepted by some Obstacle, so that the Ear can only hear the Sound reflected, as an Echo, from some other Body.—The Effect of Sound here described, revives in us, the Recollection of some of our earliest Observations, made on the Ringing of CHURCH BELLS.

ACOUSTICS also embraces the Beautiful and Delightful Science of Music, in all its Departments; and we may also add, that Sounds, Echoes, and Music, have always attracted the particular Attention of Philosophic Minds, from the Earliest Ages down to the PRESENT TIMES.

THE SCIENCE OF ELECTRICITY, which now ranks as one of the most important Branches of Natural Philosophy; and which embraces so many Subjects of Inquiry, exceedingly curious in themselves, and highly interesting, from their Relations with every Department of Nature, is almost wholly of modern Creation.

The Ancients were, indeed, acquainted with a few detached Facts, depending on the Agency of Electricity; such as the attractive Power which Amber acquires by being rubbed; the benumbing shocks which are experienced, on touching the Torpedo, or electrical Eel; the Appearance of those Sparks or Streams of Light, which, on some Occasions, are seen to issue from the human Body, &c., &c. But, no suspicion was entertained by them, that these Phenomena had any Connexion with each other; and far less was it imagined that they were the Effects of a Power, pervading all material Bodies, and extensively concerned in all the Operations of Nature.

The various Phenomena produced by this UNKNOWN NATURAL POWER; the Laws, Hypothesis, Experiments, &c., &c., by which its Operations are explained and illustrated; form together, what is now denominated, "THE SCIENCE OF ELECTRICITY."

THE PHENOMENA exhibited by this all pervading agent, are among the most terrific, awful, sublime, and beautiful in Nature. Witness the fierce tornado, the overpowering whirlwind, the destructive thunder storm, and the singular and splendid appearances of the falling stars and the aurora borealis.—It was reserved for the illustrious *Franklin*, to prove by the most simple and decisive of Experiments, the identity of the Electric Fluid and Lightning. By means of a kite, which he sent up, during a Thunder Storm, he, as it were, piercing the skies, and causing them to reveal their secrets, succeeded in procuring sparks, shocks, &c., in abundance.

After *Franklin* first caused inquiry into this subject, many Philosophers directed their attention towards it; and the Experiments of some were attended with splendid results. In the Experiments of *M. De Romas*, the streams of fire which issued from the end of the kite-string, were *ten feet* in length, an inch in diameter; and attended with a noise like that of Thunder.

Experiments of this nature, require the utmost caution and circumspection to prevent disastrous consequences.—We have unfortunately on record, an instance, which for want of sufficient care and foresight, was attended with fatal results. Professor Richman, of Petersburg, a highly talented man, had erected a large iron rod, with other apparatus for the purpose of procuring lightning. A thunder storm coming on, while he was in the streets, he hastened home, accompanied by his engraver Sokolow, to witness the effects upon the rod. He had unfortunately neglected to place some conductor connected with the ground, sufficiently near his insulated iron rod, to convey away any redundancy of the electric fluid ; and while examining some part of the apparatus, a flash of lightning, from the rod, struck him on the head, and killed him on the spot ; and thus immolated the first victim to Electrical Science. The engraver Sokolow, was thrown down by the shock ; but more fortunate than his companion, escaped without material injury.

Among the more modern Experimenters, in Atmospheric Electricity, we may mention William Sturgeon, Esq., Editor of the *Annals of Electricity* ; Andrew Crosse, Esq., of Broomfield, near Taunton ; and W. H. Weekes, Esq., of Sandwich, in Kent. The latter Gentleman has recently met with most splendid results ; and is likely, by a continuance of his experiments, to throw considerable light upon some of the obscure points in this very interesting branch of ELECTRICAL SCIENCE.

THE ELECTRICAL FLUID pervades all bodies in Nature. Under ordinary circumstances, however, it is not observable ; but it may be rendered so by various methods. If for instance a body, such as glass, be rubbed with a silk handkerchief, the equilibrium of the fluid is disturbed by the friction ; and the glass acquiring more than its natural share, is from thence said to be positively electrified ; while the handkerchief having parted with a portion of its natural electricity to the glass, is said to be negatively electrified.

Some bodies freely admit the passage of the electric fluid, and are called conductors. Of this class are all metals, living creatures, water, moist wood, &c. ; but the metals are the best conductors. Other bodies, which resist the passage of the electric fluid, are called non-conductors. Shell Lac, Glass, and rosins are of this class ; also Caoutchouc, or India Rubber, dried paper, &c. ; but shell lac and glass are the best.

The fundamental law of this science, is that *like electricities repel, and unlike attract*. Thus if two vicinal bodies, freely capable of motion, be electrified positively ; they will immediately repel each other. The same effect will take place if the two bodies be electrified negatively. But if one be positive and the other negative, attraction will be the Result.

GALVANISM is a Science which treats of the Generation and continued Production of a peculiar Modification of the Electric Fluid ; and of all the Phenomena, which, under certain Circumstances, it displays.

The Galvanic Fluid is produced, whenever two Pieces of different Metals ; as Platinum and Zinc, Silver and Zinc, or Copper and Zinc, are brought into Contact, and immersed in an acid Solution.

The Fundamental Principles of this Science, (like many others in Philosophy,) were accidentally discovered, about the Year 1790, by Dr. Galvani, Professor of Anatomy at Bologna ; and whence we derive its

Name, "GALVANISM."—Signior Volta, made great Improvements in this very curious and interesting Science; and hence, it is sometimes called "VOLTAISM."

The Current of Galvanism, among other very singular properties, has, in a variety of cases, the power to produce Chemical Decomposition, or of resolving a compound body into its elements. Thus if a current of electricity be transmitted through water, the oxygen of the water will be evolved at the point at which the electricity enters the water, and the hydrogen at the other.—Most binary combinations are thus easily decomposed, by a voltaic current of sufficient strength. It was by the application of this principle, that Sir Humphrey Davy was enabled, with such brilliant success, to decompose the alkalis and earths, which before had been regarded as simple bodies; and thus to give a most powerful impulse to Chemical Science.

In many instances, the electrical current will overcome the powerful chemical affinity of alkalis and acids; and, singular as it may appear, an acid under the influence of this current, may be transmitted through an alkaline solution, or an alkali through an acid solution, without the slightest change; though otherwise, the most energetic chemical action would be the result.

Many improvements have recently been made in the construction of Galvanic Batteries. Experimenters have directed their attention, to diminish, as much as possible, the bulk of the apparatus; and, at the same time, to increase the efficacy and duration of the current.—A battery which would furnish a constant current, for a considerable period of time, was a desideratum which has been well supplied by the battery of Professor Daniel.

The most powerful battery yet invented, is the arrangement of Mr. Groves. This Gentleman employs plates of Platinum foil, and amalgamated zinc; concentrated nitric acid being in contact with the platinum plates, and dilute sulphuric acid, with the zinc.—Some batteries of this kind will heat red hot, twenty or thirty feet of good sized platinum wire; and effect the decomposition of water, with astonishing rapidity.

Mr. Smee has introduced a battery, composed of amalgamated zinc plates, and plates of silver foil, coated with platinum; the whole acted upon by dilute sulphuric acid. This battery will maintain a powerful current for a great length of time; and is much used in the process of the ELECTROTYPE.

We may also mention the cast iron battery of Mr. Sturgeon, as being at the same time cheap, and effective. It is composed of vessels of cast iron, with plates of amalgamated zinc. For a particular description of this battery, see "Annals of Electricity," Vol. 5, Page 66.

MAGNETISM treats of the Properties of all those Bodies called Magnets, or Loadstones; the Methods of making Artificial Magnets; and all the Phenomena of Magnetic Attraction, Repulsion, Polarity, Direction, &c.

The Natural Magnet or Loadstone, is an Iron Ore, or a Ferruginous Stone, of various Forms, Sizes, and Colours; and is generally found in Iron Mines, in different Parts of the World.

It is endowed with the peculiar Property of attracting Iron; of pointing itself in a certain Direction; and of communicating the same pro-

perty to Bars of Iron and Steel, which then become Artificial Magnets, from which others may be produced, of still greater Power or Intensity. We know by the Works of Plato and Aristotle, that the Ancients were acquainted with the attractive and repulsive Powers of the Magnet; but it does not appear that they knew of its directive Property, which is, of all others, the most useful and interesting; and which has been beneficially applied in the Construction of that Valuable Instrument, "THE MARINER'S COMPASS," the Magnetic Needle of which always points towards the North; but not always, and in every Place, precisely in the same Direction.

THE VARIATION of the COMPASS is a wonderful Phenomenon; and its Cause has never yet been clearly demonstrated. This Variation differs in different Countries; and also varies at different Times, in the same Country.

At London, in 1580, the Variation was 11 degrees and 15 minutes East; in 1658, the direction of the Needle was due North and South; and in 1818, the Variation was $24\frac{1}{2}$ degrees West. This appears to be the maximum Deviation westerly, from the true Meridian; for since that Time, the Variation has diminished, being at present, about 24 degrees West.—We may also observe, that in 1804, when the Variation was 24 degrees and 8 minutes West, at London; it was only 22 degrees and 15 minutes, at Paris.

It appears from Experience, that the Magnetic Needle, may be greatly affected by several Natural Causes; as the Aurora Borealis, Earthquakes, Volcanic Eruptions, Lightning, &c., &c.—These Phenomena often cause great Agitation in the Needle; either deranging it suddenly, or disturbing its general Regularity.

Lightning often materially deranges the Needle; and it has been known, sometimes, to reverse its Poles; and, the Mariners mistaking the South for the North, have run upon Shoals or Rocks, and suffered Shipwreck.—The large Quantities of Iron, employed in the Construction and Equipment of Vessels, also exert a considerable Action on the Magnetic Needle; and at Woolwich, Professors Barlow and Christie, have made many Observations, in Order to determine and correct the Errors which must arise from this Source.

THE INCLINATION, or DIP of the Magnetic Needle, is its Deviation from its horizontal Position. This Property of the Needle, was accidentally discovered by Robert Norman, a Compass Maker at Ratcliffe, about the Year 1580.—It was his Custom to finish and hang the Needles of his Compasses, before he touched them; and he always found that after they were magnetized, their North Ends *dipped* or *inclined* towards the Earth; and in Order to ascertain the Quantity of this Inclination, he invented an Instrument, called "THE DIPPING NEEDLE."

In Northern Latitudes, the North Point of the Needle, is depressed, and the South Point elevated; but in Southern Latitudes, the South Point is depressed, and the North Point elevated; and at, or near the Equator, the Needle assumes a horizontal Position.

The Dip of the Needle does not vary materially at the same Place; but differs considerably in different Latitudes; and near the North Pole the Needle is almost vertical, or nearly in the Direction of a Plumb Line.

At London, in 1775, Mr. Cavendish found the Dip, or the Angle which the Needle made with the Horizon, to be 72 degrees and 30 minutes; and in 1805, Mr. Gilpin, by his Observations, made it 70 degrees and 20 minutes; but in Latitude 80 degrees North, the Dip of the Needle is 88 degrees below the Horizon, according to Captain Parry's Observations, in his attempt to discover a North West Passage into the PACIFIC OCEAN.

THE TERM ELECTRO-MAGNETISM, is derived from the Union of the two Words, Electricity and Magnetism; and is the Name given to that Science, which treats of the mutual Action which exists between them, and of the various Phenomena that are produced by their united Influence.

A strong conviction had long existed generally, in the Minds of Philosophers, of the Identity subsisting between the Electric and the Magnetic Fluids; and in 1820, Professor *Ersted* succeeded in making Electricity act as Magnetism, in a sure and a permanent Manner; and thus established the Basis of the Science, on a solid and lasting FOUNDATION.

Becquerel, *Ampere*, *Jacobi*, *Lenz*, *Faraday*, *Barlow*, *Sturgeon*, *Marsh*, and many others, have made numerous Experiments, and great Improvements in the Science of ELECTRO-MAGNETISM.

The Weight that may be sustained by a Good Electro-Magnet and a Powerful Battery, is very astonishing; and far exceeds any Weight that can be supported by either Natural or Artificial Magnets.

The following Gentlemen have made Electro-Magnets of various Forms, Weights, and Sizes; and of Course, differing in their Powers, as may be seen by the Numbers placed opposite to their Names, and which denote the Weights that the different Magnets sustained, in Pounds *Avoirdupois*.

<i>Names.</i>	<i>Pounds.</i>
Professor Henry	750
Mr. J. C. Nesbit	1428
Professor Henry	2063
J. P. Joule, Esq.	2090
Joseph Radford, Esq.	2500
J. P. Joule, Esq.	2710
Richard Roberts, Esq.	2950

Mr. Roberts's Magnet is the most powerful that has ever been constructed, either by the ordinary Modes of magnetizing Steel Bars, or by the Voltaic Current; the Weight it sustained being reduced, is 1 ton, 6 cwt., 2 qrs., 10 lb.

For further Information on this interesting Subject, we refer our Readers to *Sturgeon's Annals of Electricity, Magnetism, and Chemistry*, Vol. V., Page 193; and Vol. VI., Pages 166, 231, and 431; in which Work they will find Abundance of Matter for their Improvement and Gratification.

THERMO-ELECTRICITY is one of the most important Consequences of the Discovery of Electro-Magnetism; and affords us the Means of detecting the Presence of Electricity, where it was never supposed to exist.

This is accomplished simply by two Pieces of Metal of unequal Temperatures, the Ends of which are connected in a particular Manner,

or by one Piece of Metal with its Ends connected, and one End made warm, while the other remains cold; or by a Piece of Wire, one End of which being heated to redness, and then brought into Contact with the other End; nay, even two Pieces of moist Clay, one of which is hotter than the other, on being brought into Contact, exhibit the same Phenomena.

If the Metals, in this prepared State, be presented to the Magnetic Needle, it is immediately affected; and this evidently shows that a Current of Electricity is produced, which always passes from the warmer, towards the colder Ends of the Metals.

This Discovery was made by Seebeck; and the Subject has been successfully prosecuted by the Experiments of Becquerel, Cumming, Melloni, Nobili, Peltier, Sturgeon, Barlow, and Marsh.

MAGNETO ELECTRICITY.

MAGNETO ELECTRICITY describes the production of Electric Currents in conductors, by the action of Magnets, and is a most interesting portion of the Science of **ELECTRO-MAGNETISM**.

Dr. Faraday discovered, that an Electric Current was produced in a wire, by moving it between the poles of a magnet. The direction of the current depends upon the direction of motion, and the position of the poles of the magnet, with respect to the conducting wire. A current is also produced when a magnet is moved in the interior of a hollow coil of wire, or when a piece of soft iron surrounded by a coil of wire is rendered magnetic.

Few Departments of Scientific Research, have been pursued with greater success than that of Magneto Electricity. A great number of facts have been accumulated within a few years; but there is yet a vast mine of unknown wonders to be explored, by the philosophic and enquiring mind, and to attract the attention of the curious. Not only have sparks and shocks been produced by the action of magnets; but currents have been obtained, of sufficient power to heat metallic wires, perform Chemical Decompositions; and to exhibit the same Phenomena as result from the action of Galvanic Currents.

A variety of Instruments have been constructed, by different Experimenters, to produce these effects. They are called Magneto Electrical Machines. Among the first were those of Pixii and Saxton.—Mr. Sturgeon also made some very peculiar Arrangements for this Purpose; and was, we believe, the first who obtained any approach to a continuous Current. There are Instruments of this Class exhibited at the Polytechnic Institution, Regent Street; and at the Adelaide Gallery, Lowther Arcade, London. Dr. Page, of America, has also produced a powerful Machine, the form of which is certainly very advantageous. But one made by Mr. J. C. Nesbit, which combines the advantages of Dr. Page's, with several other novel improvements, has a far greater decomposing and heating power than any yet placed on record.

The conducting wire on this Instrument, weighs twenty pounds.—There are two sets of bent steel compound magnets, of eight bars each set. Each bar before it was bent was in length, 2 feet 6 inches; and one inch and one-eighth in breadth. The magnets weigh about 40 lbs. The *armatures* are straight, 8 inches in length, and four in number.

This Machine will heat 3 inches of Platinum wire, one-fiftieth of an inch in diameter, above a red heat.—In an Experiment on the Decomposition of water, nearly four cubic inches of the Mixed Gases were obtained in five minutes.

When not in use as a Magneto-Electrical Machine, it becomes, by the application of a Galvanic Current, an Electro-magnetic Engine of considerable Power.—This Instrument is deposited in the Victoria Gallery of Practical Science, Manchester.

In relation to the subject of Magneto-Electricity, it may be remarked, that currents may be produced by the Magnetism of the Earth; by moving a wire or other conducting body, in a proper direction with respect to the Magnetic Poles of the Earth. From this interesting fact, we learn that all conducting bodies, in the earth, when put in motion, will produce Electric Currents.—How far this may go to explain the Phenomena of Thunder Storms, Falling Stars, and Aurora Borealis will be seen when future Experiments and Observations shall have increased our Knowledge; and furnished us with more extended data, respecting these singular APPEARANCES.

ADVANCEMENT OF SCIENCE AND KNOWLEDGE.

THE PRESENT AGE is one of the most remarkable and surprising periods in the whole history of man.—We find real matter for admiration and astonishment, when we review the rapidity with which Nature is now made to reveal her inmost secrets; and the immense number of new and interesting facts, which, on every side, are pouring in from the numerous labourers in the field of Science.

M. Daguerre has immortalized his name by his discovery of the process of the *DAGUERROTYPE*; one of the most astonishing, splendid, and useful discoveries of recent times. By this invention, light, an impalpable, imponderable, and most subtle agent, is coerced, and employed to perform at once the business of the Artist and the Engraver: and to depict with faithful exactness, the terrific, the sublime, or the beautiful in nature; the haunts of busy man; or the more softened outlines of the human countenance.

The rapidity with which this process is performed is certainly not the least astonishing part of the invention; a few seconds prove completely adequate to the delineation of any object, the view of which we wish to obtain.

The recent experiments of Mr. Spencer, of Liverpool, by which he was enabled, by means of a Galvanic Current, to precipitate copper or other metals, so as to take the exact impression of any mould, casting, coin, or other form which he presented to the action of the current, will prove of eminent utility in our Calico Printing; and in all descriptions of Copper Plate Engraving, by enabling the Artisan to augment, at pleasure, the number of Copper Plates, the Engraving of which may be of the most delicate kind; and thus to multiply cheap impressions of the most noble Works of Art.—Indeed, it is extremely probable, that eventually, the present mode of Engraving will be entirely superseded by the use of the *ELECTROTYPE*.

We are now reaping the advantages of that System of studying and interrogating Nature, devised by that Father of Modern Experiments

Philosophy, Lord Bacon. He indeed may be said, by his gigantic mind, to have cleared the way of knowledge, to have shown the path to the temple of truth; and to have left succeeding travellers little else to do, but to follow his instructions.

Within this last half century, more has been effected in the development and elucidation of Science, than by the previous labours of two thousand years.—The extension of the benefits of Science to all classes of Society; to the means of all, and to the wants of all, is characteristic of the *present Age*.

Science and Philosophy are no longer speculative but practical. They are no longer confined to the College Student or the Gowned Professor; but have penetrated the Humble Cottage and the Lowly Roof. The Hill of Science is no longer trodden by a few, but is crowded by votaries of all Ranks.

Science is now sought after as a means of extending our authority over Nature, to subject her to our needs; and to compel her to minister to the wants, comforts, and conveniences of Man. The Youth of our Time, have revealed to them Vast Laws of the Universe, which one hundred years since, had not dawned on the Greatest Minds.

Day by day the secret Operations of Nature, are rendered more apparent; and every new discovery gives to the serious and contemplative mind, fresh cause of Gratitude to the All-wise and Beneficent Creator, who has impressed Matter with such active Properties, and endued the Mind of Man with Ability and Energy to bring them to Light; and to cause the Elements of Nature to be subservient to the WANTS and COMFORTS of the HUMAN SPECIES.



• GENERAL OBSERVATIONS ON EDUCATION.

ALL THE VARIOUS SCIENCES, both Mathematical and Philosophical; and all the different Branches of Knowledge and Education, that are mentioned in the preceding Pages, have either their General or Particular Uses, in conducting the Practical Affairs of Real Life and Business; and as no Man can foresee what Situation he may have to fill, or what Duties he may have to perform, in his Passage through Life, it behoves every Young Person to obtain all the General and Scientific Knowledge in his Power.

Besides the Advantages resulting from Learning and Science, in the various Departments of Life; Knowledge always confers Honour and Dignity upon its Possessor; but particularly when it is found united with Perseverance, Energy, Virtue, and True Piety.—Indeed, it is admitted by all competent Judges, that *Sound* Education, and *Genuine* Knowledge, promote VIRTUE and CHRISTIANITY.

SCIENTIFIC PURSUITS, independently of REVELATION, form an excellent Antidote against the Poison of Super-

stition, Skepticism, and Infidelity; for HERE we clearly behold the FINGER OF GOD, in the General Laws and Operations of Nature; and in the Order, Beauty, Magnificence, Power, and Goodness displayed in the CONSTRUCTION of the UNIVERSE.

MR. SHEPHERD observes, in the MOTTO we have prefixed to this Little Work, that "The Degrees and the Species of Art and Skill, exhibited by the Human Race, are almost infinitely varied; and that a long Space of Time must intervene before any Individual can attain to that Measure of Knowledge which he is capable of acquiring."—Now, as this is the Case, and as the Time allowed for the Education of Youth, is always limited, it becomes the peculiar Duty of Teachers to direct the attention of their Pupils to the Study of those Branches of Knowledge that are most likely to be of the greatest Service to them in the various Trades, Callings, or Professions for which they are designed by their PARENTS and FRIENDS.

LEOTYCHIDAS, the Spartan, having been asked, what Boys ought to be taught most in their Youth, answered, "What will be most useful to them, when they have become Men."—MILTON has also observed, that "To know the Things which lie before us, in daily Life, is the prime Wisdom."—These obvious Dictates of Common Sense, ought always to be kept in view by Parents, by Guardians, by Teachers of Public Seminaries, and by all INSTRUCTORS of YOUTH.

IT CERTAINLY requires the nicest and the most correct Discrimination, to draw the *proper* Line for a Boy to pursue,—first, in his EDUCATION,—and secondly, in the Business of LIFE.—Difficult, however, as it may be, *accurately* to draw this Line; yet much may be effected by minute Observations, careful Remarks, and mature Reflections on the various Dispositions, Inclinations, and Talents exhibited by Youth.—But, as to the Necessity of varying the Routine of Learning, there cannot be two Opinions upon the Subject; as it is manifest, that the Engineer, the Architect, the Builder, the Land Surveyor, the Agriculturist, the Mechanic, the Manufacturer, the Merchant, the Mariner, the Lawyer, the Physician, and the Divine, must each require a Course of Study, when beyond the first Rudiments, as different as will be their various Engagements, Occupations, and Pursuits, in FUTURE LIFE.

EXTRACTS FROM MR. NESBIT'S LETTER ON EDUCATION,
PUBLISHED IN 1827.

"THE CONSTRUCTION of the mind is of such a nature as only to admit of a gradual progress in knowledge. The streams of instruction must be made to flow gently, like the meandering of a crystal brook; and not in overwhelming torrents, like the rushing waters of a mighty cataract. The acquisition of one science prepares the mind for the reception of another; and Dr. Johnson has well observed, 'that we can only acquire a knowledge of what we do not understand, by the assistance of other things which we already comprehend.'

"Reading has very properly been styled the key to all other sciences; but having obtained the possession of this key, we must use it; or the locks will still remain unopened. We must not only *read*, but we must *think*, and *analyze*; or our acquisitions in knowledge will be both slow and superficial.

"Reading proper books, with care and attention, is not only a source of amusement and gratification; but a real intellectual feast. It enlarges the mind, improves the understanding, rectifies the judgment; and puts us in possession of the opinions of the greatest of men, both ancient and modern; and all this may be obtained by a proper employment of our leisure hours. But to gain a general knowledge of the Sciences, requires the utmost stretch of our mental Abilities, under the Direction of able and experienced TEACHERS.

"The Rev. James Macgowan, in his Essay on Education, very justly observes, that 'In consequence of the enlightened and judicious measures which have long been employed in educating the children of the poor, the time is at hand, when we may expect to see them very frequently successful in their competitions with their superiors in birth; unless effectual means be adopted for securing to the latter, a Superiority in Knowledge.'—It is also observed, in the Monthly Review, that 'The lower ranks are pushing up to our stations, in Knowledge; and to maintain our Elevation, we ourselves MUST MOUNT HIGHER.'

"THE FIELD OF SCIENCE is large, beautiful, and richly adorned with the most delightful Flowers; but they cannot *be gathered* without Exertion. Whoever expects to take of

the rich and bountiful crop which this Field produces, must be at the Labour of reaping. No Person must expect to taste of the delicious Juice of the Grapes produced in this Vineyard, without treading the Wine-press. To obtain a Knowledge of Grammar, Composition, Geography, History, Chronology, and the various Branches of Natural History; we must *mark, learn, and inwardly digest.*

"To become acquainted with Arithmetic, Mensuration, Geometry, Trigonometry, Astronomy, Algebra, Fluxions, and Practical Mechanics, we must not sit still and cry help! help!—A Knowledge of Statics, Dynamics, Hydrostatics, Hydrodynamics, Hydraulics, Pneumatics, Optics, Chemistry, Magnetism, Galvanism, Mineralogy, and other Branches of Natural Philosophy, cannot be obtained by folding the arms to rest;—but then, the Study required for their Attainment will be *infinitely* repaid by the Acquisition of Knowledge, and the Improvement of the Mind.

"Perhaps some Persons will say, that many of these Sciences are far too sublime and intricate for the Study of Boys; but we must recollect that our Pupils will very soon become Men, in whose hands will be placed the Affairs of our Nation; and Professor Stewart has well observed, that 'the Object of Education should be to cultivate all the various Principles and Powers of our Nature, both speculative and active, in such a Manner as to bring them to the greatest Perfection of which THEY ARE CAPABLE.'"

EXTRACTS FROM A LECTURE ON THE STUDY OF THE MATHEMATICS, DELIVERED, NOVEMBER 12th, 1833, BY J. R. YOUNG, PROFESSOR OF MATHEMATICS, IN BELFAST COLLEGE.

"IN CERTAIN APPLICATIONS of the higher Mathematics, even when simplified to the utmost Degree, Difficulties will doubtless occur; to overcome which, will require the Exercise of much patient Thought, on the Part of the Student, as well as the skilful Application of much anterior Knowledge. He, indeed, who aims at Distinction in any Department, either of Literature or Science, must lay his account with much personal Exertion and much private Study; and he who expects to attain an intimate and extensive Acquaintance with Mathematical Science, simply by attending *Lectures*, will, I fear, find himself grievously disappointed."

"I must honestly tell him, that I shall consider my Duty Performed, if I can but place the Subject before him, in an *intelligible and attractive Form*.—if I can impart to him a Taste for the Pursuit.—I, indeed, can do little more than place him fairly in the Right Path, direct his first Steps; and remove the more formidable Obstacles out of his Way.

"I cannot run the *Race* for him; although I may be able, occasionally,

to smoothe the Asperities of the *Road*. His Success must be the Reward of his own Exertions; while the very Utmost that I can expect from mine, will be the *humble* but *encouraging* PRAISE of having been a USEFUL AND A FAITHFUL GUIDE."

EXTRACTS FROM THE REV. JOHN TODD'S STUDENT'S GUIDE.

"TAKE IT FOR GRANTED, that there is no Excellence without great Labour. No mere aspirations for eminence, however ardent, will do the business. Wishing, and sighing, and imagining, and dreaming of greatness, will never make you great. If you would get to the mountain's top, on which the *temple of fame* stands, it will not do to *stand still*, looking, and admiring, and wishing you were there. You must gird up your loins, and go to work with all the indomitable energy of Hannibal scaling the Alps. Laborious Study, and diligent Observation of the world, are both indispensable to the attainment of eminence. By the former, you must make yourself master of all that is known of science and letters; by the latter, you must know *Man* at large, and particularly the character and genius of your own *Countrymen*.

We cannot all be FRANKLINS, it is true; but by imitating his mental habits and unwearied industry, we may reach an eminence we should never otherwise attain. Nor would he have been the FRANKLIN he was, if he had permitted himself to be discouraged by the reflection that we cannot all be NEWTONS. It is our business to make the most of our own talents and opportunities; and instead of discouraging ourselves by comparisons and impossibilities, to believe all things imaginary possible; as, indeed, almost all things are, to a spirit bravely and firmly resolved. Franklin was a fine model of a PRACTICAL MAN, as contradistinguished from a VISIONARY THEORIST, as men of genius are very apt to be. He was great in the greatest of all good qualities—SOUND, STRONG COMMON SENSE. A mere *bookworm* is a *miserable driveller*; and a mere genius, a thing of gossamer, fit only for the winds to sport with.

Direct your intellectual efforts principally to the cultivation of the strong, masculine qualities of the mind. Learn, (I repeat it,) to *think—think deeply, comprehensively, powerfully*; and learn the simple, nervous language which is appropriated to that kind of thinking. Read the legal and political arguments of our Statesmen. *Study them*, and observe with what an omnipotent sweep of thought they range over the whole field of every subject they take in hand,—and that with a scythe so ample and so keen, that not a straw is left standing behind them. Brace yourself up to these great efforts: strike for this giant character of mind; and leave *prettiness* and *frivolity* to *Triflers*.

It is perfectly consistent with these Herculean Habits of thinking, to be a Laborious Student; and to know all that books can teach. You must never be satisfied with the surface of things; probe them to the very bottom; and let nothing go till you understand it as thoroughly as your powers will enable you.—Seize the moment of excited curiosity, on any subject, to solve your doubts:—for if you let it pass, the desire may never return; and you may remain in ignorance. The Habits which I have been recommending are not merely for *School*, or for *College*, but for *Life*."

EXTRACTS ON EARLY RISING, FROM THE SAME VALUABLE WORK.

"FEW EVER LIVED TO A GREAT AGE, and fewer still ever became distinguished, who were not in the Habit of *early rising*. You rise late, and of course commence your business at a late hour; and every thing goes wrong all day. Franklin says, 'that he who rises late may trot all day, and not have overtaken his business at night.' Dean Swift avers, 'that he never knew any man come to Greatness and Eminence, who lay in bed of a morning.'

Frederick the Second, King of Prussia, even after age and infirmities had increased upon him, gave strict orders never to be allowed to sleep later than four in the morning. Peter the Great, whether at work in the Docks at London, as a Ship-carpenter, or at the Anvil of a Blacksmith, or on the Throne of Russia, always rose before *day light*. 'I am,' says he, 'for making my life as long as I can, and therefore sleep as little as possible.' Doddridge makes the following striking and sensible remarks on this subject:—'I will here record the observation, which I have found of great use to myself, and to which, I may say, that the production of this work (Commentary on the New Testament,) and most of my other writings, are owing; viz., that the difference between rising at five and at seven o'clock in the morning, for the space of forty years, supposing a man to go to bed at the same hour at night, is nearly equivalent to the addition of *ten years to a man's life*.'

In order to *rise early*, I would earnestly recommend an *early hour for retiring*. There are many other reasons for this. Neither your eyes nor your health are so likely to be destroyed. Nature seems to have so fitted things, that we ought to rest in the early part of the night. Dr. Dwight used to tell his Students, 'that one hour of sleep before midnight is worth more than two hours after that time.'—Let it be a Rule with you, and scrupulously adhered to, that your light shall be extinguished by *ten o'clock* in the evening. You may then rise at five, and have seven hours to rest, which is about what nature requires.

After you are once awakened, be sure to use the first consciousness in getting upon the *floor*. If you allow yourself to parley a single moment, sleep, like an armed man, will probably seize upon you; and then your resolution is gone, your hopes are dashed, and your good intentions destroyed.—I dwell upon this point, because a love for the *Bed*, is too frequently a *besetting Sin of Students*; and a Sin which soon acquires the '*Strength of a Cable*.'

NOTE.—Here Mr. Nesbit wishes to call the Attention of his Juvenile Readers to "*An Address to Young Students*," written by him, upwards of Twenty Four Years since; and published in 1817, at the End of his *English Parsing*.

 MUTUAL INSTRUCTION.

"ANOTHER EXCELLENT METHOD of conveying Instruction, is to *permit* the Senior Pupils, *sometimes* to assist their Junior School-fellows; and if Parents were fully sensible of the great Advantages resulting from this Method, they would not raise those *futile* Objections against it, which

they occasionally have done.—Those Teachers who have *impartially* tried the Method, have found it to answer beyond their utmost Expectations; and as we have practised it, to a *certain extent*, in our own School, for many years, we can also add our Testimony of its complete Success, both as regards the Young Teachers themselves, and also those to whom they rendered their Assistance.

In order to make a Learner completely master of any Science, it is necessary for him to re-study it several times; and if a part of the time that must necessarily be spent in this manner, be devoted to the instruction of others, an emulation to excel, is excited in both parties; and without such an emulation, the business of a School DRAGS HEAVILY ON.—The person who receives the assistance, is encouraged to imitate his Young Instructor, in the acquisition of knowledge; and he who communicates the information profits more than he would do, if he followed his own studies in a regular and unremitted manner; for in the course, *even of one day*, many various subjects will be brought under his consideration; and hence, he is led, almost imperceptibly, to retrace his own acquisitions. Besides, it leads him to feel his own importance; makes him fully acquainted with his own acquirements; fixes those acquirements more indelibly on his mind; creates in him a desire for greater attainments; unfolds to him his own deficiencies; and points out the method of supplying those deficiencies, by teaching him to *think* and to *analyze*; and without these two qualifications, no great advancement will ever be made, either in General or Scientific Knowledge.

The System of Mutual Instruction is no *New Theory*; no *Speculative Scheme*.—Cicero, Lilye, Locke, and the Edgeworths, every one of whom wrote chiefly for the higher Orders of Society, have all been in favour of Mutual Instruction; and have pointed out its advantages in a very forcible and energetic manner. Cicero says, 'We are not only inclined to receive information ourselves; but also to communicate it to others.'—Lilye observes, 'He who teaches the unlearned, although unskilful himself, may soon become more learned than his Pupils.'—Locke says, 'When any one has learned any thing himself, the best way of fixing it in his mind, is to set him to teach it to others.'—The Monthly Review observes, that 'The Edgeworths did little more than enforce with more energy and earnest-

ness than any other modern writers, the necessity of making Children take a part in each other's Education.'

This System has been adopted, for many years, in the Education of the lower orders; and has been attended with that success, as generally to give peculiar satisfaction to visitors and inspectors, and to excite their warmest admiration; and where it has been tried, its success has not been less admirable in the Education of the higher orders of Children, both in the Classics, Mathematics, and general departments of Learning; but then it should be kept *within proper limits*, so as not to infringe too much upon the time of the Senior Pupils, and prevent them from making regular advances in General Knowledge, and in the Higher Branches of Science and Literature.

VIEWING THE SUBJECT OF EDUCATION, in every Light, and under all its Bearings, it appears that the evidence which has been adduced, on various occasions, warrants the conclusion, that the System of Mutual Instruction, carried to a *limited extent*, under the direction of able and judicious Teachers; kind and impressive admonitions; strict but not rigorous discipline; proper and convenient arrangements; regular divisions of time, for the study of different sciences; frequent lectures and dictates, on various departments of literature; useful and improving subsidiary exercises; particular and general interrogatory and experimental examinations; orderly conduct, and regular attention and application in the Pupils; prudent advice and salutary correction from Parents; a good understanding between them and the Teachers; the use of proper and improved School Books; and extensive reading on general and scientific subjects, afford the best and most effectual means of securing to the Children of the Higher Orders, a Proper and Necessary SUPERIORITY OF EDUCATION."

REMARK.—The last Article was written by Mr. Nesbit, upwards of Fifteen Years ago, and published in his Practical Arithmetic, in 1826; and he can now candidly affirm, that the Lapse of Time and more Experience, have not altered his Opinion, on this Subject; but have greatly strengthened and confirmed it, in the Favour of "*Mutual Instruction*," carried to a limited and judicious extent, under the Direction of *Able and Diligent Teachers*.

EXTRACTS FROM VARIOUS AUTHORS, RELATING TO THE ADVANTAGES OF MATHEMATICAL, PHILOSOPHICAL, CHEMICAL, AND OTHER SCIENTIFICAL STUDIES.

ARITHMETIC.

"ARITHMETIC is of such general Use in all Parts of Life and Business, that scarcely any Thing can be done without it:—This is certain, a Man cannot have too much of it, nor know it too perfectly."—*Locke*.

"Take away Arithmetic, which is the Art by which we come to the Knowledge of Weight and Measure; and all that remains is base and of no Estimation."—*Plato*.

"The Knowledge of Numbers is necessary for every one who is acquainted with the first Elements of Learning."—*Quintilian*.

"When we consider the Utility of Arithmetic, on which Science almost all the others do absolutely depend, we need not be surprised that so many Efforts have been made to bring this useful Branch of Learning to the utmost Degree of Perfection."—*Vyse*.

"Arithmetic is a Science, as well as an Art; and no one can be a Proficient, or an accurate Accountant, unless he keep its Principles continually in View."—*Parker*.

"I do not know any Business that can be well executed without Arithmetic; therefore, it claims the first Place, and the due Care of the Master, to inculcate and explain its Rudiments."—*Mountaine*.

"The Man who can produce a neat and luminous Explication of the various Rules in Arithmetic, is best entitled to Popular Support."—*Peacock*.

"Arithmetic being the first great Branch of the Mathematics, its application is to be found not only in the common Affairs of Life, Business, and Commerce; but also in all the Sciences that are called Mathematical, and which have all their different Uses in Society."—*Malcolm*.

"As the foundation of Mathematical Learning, the Science of Arithmetic is of inestimable Value. Its Use and Importance are also recognized in all the active Employments of Life. Without it, no Business can be transacted, either at home or abroad:—no Trade or Commerce can be carried on, without the Aid of Numbers."—*Passman*.

"Arithmetic is justly considered as the Basis of every Part of Mathematics; for, even in comparing Magnitudes with each other, Recourse is frequently had to Numbers. Several Instances occur in the Fifth Book of Euclid, which, in many Parts, would be almost unintelligible, without a Reference to Numbers."—*Keith*.

MENSURATION.

"MENSURATION is a Branch of the Mathematics which is brought so frequently into Use, that there are but few Men, who have not sometimes Occasion for its Assistance."—*Fletcher*.

"Mensuration, in consequence of its very extensive Application to the various Purposes of Life, may be justly considered as one of the most important of the Mathematical Sciences."—*Barlow*.

"Next to Arithmetic, Mensuration is a Subject of the greatest Use and Importance; both in the Affairs that are absolutely necessary in human Life, and also in every Branch of the Mathematics."—*Hutton*.

"Mensuration, if considered in its utmost Extent, would include all the Branches of Practical Mathematics; but Custom has restrained it to the Method of measuring the Lengths of Lines, and finding the Superficial and Solid Contents of Figures. These Studies are highly beneficial to Mankind; but particularly to those Persons who are employed in Practical Business."—*Robertson*.

"Mensuration, like all other useful Inventions, appears to have been the Offspring of Want or Necessity. Artificers of almost all denominations, are indebted to this Invention, for the Establishment of their several Occupations, and the Perfection and Value of their Work.—By this Means, the Architect lays down his Plans, and erects his Edifices. Bridges are built, Ships are constructed; and Property of all Kinds is accurately measured, and justly estimated by the Art of MENSURATION."—*Bonnycastle*.

GAUGING.

"PRACTICAL GAUGING teaches the Method of finding the Capacity of any Vessel; or how much it contains, when it is quite full, or only Partly filled with Liquor. All liquid Measures are computed by solid Inches, Gallons, &c.; hence, Gauging is a very useful Department of Solid Measure."—*Fletcher*.

"The meaning of the word Gauging, is restricted to the measuring of Casks, and other Vessels falling under the Cognizance of the Excise; and it has received its name from a Gauge or Rod, used by Practitioners."—*Hutton*.

"Gauging is the Practical Method of finding the Areas and Contents of all Sorts of Vessels, in Gallons, Bushels, &c.; not only of Ale, Beer, Spirits, Wine, and Malt; but also of Cyder, Perry, Vinegar, &c., &c."—*Turner*.

"In this Work, I have exerted my utmost Endeavours to extend the Useful and Valuable Art of Gauging, by laying down the most general, accurate, and easy Methods of determining the Measures of all the various Forms of Vessels, which occur in Practice."—*Moss*.

"THE SCIENCE of Gauging is one of the most useful Branches of the Mathematics. It is applied to finding the Contents or Capacities of all kinds of Open Vessels, such as Cisterns, Couches, Vats, Tuns, Backs, Coolers, Coppers, Stills, &c., &c.; and also in the Gauging and the Ullaging of Casks of every Kind and VARIETY."—*Leadbetter*.

LAND SURVEYING.

"LAND SURVEYING was held in great Estimation by the ancient Egyptians, Grecians, and Romans; and its being so pleasant and delightful a Study, together with the great Usefulness that attends it, has induced many of the Moderns to apply themselves to the Cultivation of this Branch of the MATHEMATICS."—*Davis*.

"The original Name of Land Surveying, or Mensuration, was 'Geometry;' and its primary Use was to measure the Surface of the Earth, or any Distances or Dimensions upon it; but it afterwards became a general Term for the Measurement of Magnitudes universally. Hence, it is now applied not only to the Measurement of Lands; but also to finding the Surfaces, Solidities, and Capacities of Bodies of every Shape and Form; and likewise to the various Methods employed in their Con-

struction; consequently, it now constitutes one of the most useful and extensive Branches of the MATHEMATICS."—*Passman*.

"The Importance of Land Surveying must appear obvious when it is considered that many who are well versed in the Mathematics, and completely Masters of the Theory of Surveying, are often strangely bewildered when in the Field, from a want of Readiness, in adapting the Instruments to the Occasion; a Facility which can only be acquired by a thorough Knowledge of their Use, and by Practical Experience. The Learner should also be made acquainted with the most approved Methods of keeping Field Books; and of making Eye-sketches. Likewise with plotting, protracting, and beautifying Plans, both with Indian Ink and Colours; LAYING-OUT, PARTING-OFF, AND DIVIDING LANDS," &c., &c.—*Ainsley*.

"There are few Practical Branches of the Mathematics of greater Importance to this Country, than Land Surveying. It is not only absolutely necessary for Surveyors and Commissioners, for OLD AND NEW INCLOSURES, but it is a very material Object to all Persons who may wish to become Stewards; it being a Principal Recommendation.—Besides it is a Gratification as well as an Advantage to any Gentleman who is interested in Landed Property, or who moves in the Agricultural Departments of Society, to understand the METHODS pursued in *Measuring, Planning, Valuing, and DIVIDING LAND*."—*Stephenson*.

TRIGONOMETRY.

"TRIGONOMETRY is a Science of the greatest Importance in almost every Branch of the Mathematics, and particularly in Astronomy, Navigation, Surveying, Dialling, &c., &c.; and accordingly it has been practised, in all Ages, by MATHEMATICIANS."—*Professor Barlow*.

"UPON TRIGONOMETRY depend Geography, Dialling, and Navigation, without which it is impossible they can be maintained; for the Mariner cannot conduct a Ship through the unbeaten Paths of the Ocean, without its Assistance.—By this Science, the Geographer is enabled to lay down Countries, Cities, and Towns, in their true Latitudes and Longitudes; and the Dialist is informed how to trace out the Hour of the Day, in any Part of the World, by the Shadow of a *Gnomon*, placed on a Plane, though it be ever so irregular;—for these Reasons I would advise every Man who has the *Care* of a SHIP or of a SCHOOL, not only to inform HIMSELF well of the Nature and Properties of this Science, but also to teach it *diligently* to his PUPILS."—*Leadbetter*.

"TRIGONOMETRY is an important Branch of the Mathematical Sciences:—the Speculative Parts, like the Elements of Euclid, habituate the mind to close and demonstrative Reasoning; and the Practical Parts are of extensive use in the Common Concerns of Life.—By Trigonometry we determine the Magnitudes of the Earth and Planets; and the Positions of the Fixed Stars with respect to each other, by which we are enabled to depict the Appearance of the Heavens in a small Compass.—The Distances of the Planets from the Sun, their Motions, Eclipses, and other Phenomena, are calculated by Trigonometry; as are likewise the Distances and Position of Places on the Earth, with their Latitudes and Longitudes; it may therefore, justly be considered as the Basis of *Astronomy and Geography*.—Navigation, with all its modern improve-

ments, depends entirely on Trigonometry; it is the Foundation of Maritime Surveying, and almost every Branch of PRACTICAL MATHEMATICS."—*Keith*.

ASTRONOMY.

"ASTRONOMY is now considered as a needful and an important Branch of Knowledge, for every well educated Person. To those who hold a respectable Rank in Society, a General Acquaintance with the Order of the Heavenly Bodies; and the Laws by which they are governed, must at some Time, necessarily become a Part of their INQUIRIES."—*Guy*.

"ASTRONOMY is a Subject which will awaken every Faculty of your Mind; and is, of all others, the best calculated to excite your Curiosity and Admiration. To contemplate the grand Spectacle of the Heavens, has ever been considered as the noblest Privilege of our Nature; for it is here that we discover the Wonders of the Deity, and see his Wisdom in the Works of the Creation.—It may also be observed, that Astronomy is a Science of the earliest Antiquity; and has challenged the admiration of all Ages. Poets, Historians, and Philosophers, have all given it their highest Encomiums; and even Kings themselves have enriched it with their LABOURS."—*Bonnycastle*.

"ASTRONOMY is a Science which needs no laboured Eulogium, for its intrinsic Excellence, and its attendant Advantages are such, that it has been studied, encouraged, and promoted, by the most learned and eminent Men of all Ages and all Countries. Astronomy not only contributes to the Improvement and Perfection of Chronology, Geography, and Navigation; to the Extension of Trade and Commerce, and the consequent Comforts of Life; but it is also of admirable Use, in strengthening the Mind, by proper Exercises, in arming the Reason against the Vanity of Scepticism and the Delusions of Sophistry; and in adding fresh Power to the native Force and Penetration of the Understanding."

"Besides these Benefits, which all are willing to ascribe to Astronomy, there are others which are not so universally acknowledged, yet ought not to be neglected or forgotten:—this most delightful, this noblest of all the Sciences, subjects, as it were, the Economy of the Universe to our Contemplation:—it enables us to obtain a nearer Acquaintance with the most numerous, the most stupendous, and the most magnificent Scenes in the whole Creation; to trace out their mutual Inter-courses, their certain and determined Motions, their regular Returns, their stated Periods,—to discover the inviolable Laws which regulate the Heavens, and the admirable Harmony which pervades the Universe: and while we are thus engaged, while we are permitted to scale the Ethereal Towers, and freely range through the Celestial Fields, is it possible that we should not be impressed with a Sense of the unlimited Power, unbounded Wisdom, and infinite Goodness of the ADORABLE CREATOR AND GOVERNOR?"—*Dr. O. Gregory*.

GEOMETRY.

"THE ELEMENTS OF EUCLID are the Foundation of a Science by which the Investigation and Discovery of useful Truths, at least in Mathematical Learning, is promoted as far as the limited Powers of the Mind will allow; and which likewise is of the greatest Use in the

Arts, both of Peace and War, to many of which Geometry is absolutely NECESSARY."—*Dr. Simson.*

"OF all the Scientific Works of Antiquity, that have been transmitted to the present Times, none are more universally and deservedly esteemed than the Elements of Geometry which go under the Name of Euclid. In many other Branches of Knowledge, the Moderns have far surpassed their Masters; but after a Lapse of more than two thousand Years, this Performance still maintains its original *Pre-eminence.*"—*Bonnycastle.*

"GEOMETRY, selecting only the Generic Property of Magnitude, can safely pursue the most lengthened Train of Investigation, and arrive, with perfect Certainty, at the remotest Conclusion.—This Science proceeding from a Basis of extreme Simplicity is therefore supereminently distinguished by the luminous Evidence which constantly attends every STEP OF ITS PROGRESS."—*Leslie.*

"FROM the Egyptians, the ancient Greeks derived their Acquaintance with Geometry; and in the Hands of this acute People, it was carried, from a State of comparative Nothingness, to a Degree of Perfection which has scarcely been advanced by succeeding Ages. If, however, as a Science, Geometry has made but little Progress, since it was so successfully cultivated by the Greeks; its Uses have been both multiplied and extended. In the present Day, it embraces the Measurement equally of the Earth and of the Heavens: it forms with Arithmetic, the Basis of all accurate Conclusions, in the mixed Sciences; and, there is scarcely any Mechanical Art, our Views of which may not be improved by an Acquaintance with GEOMETRY."—*Library of Useful Knowledge.*

"GEOMETRY is the most sublime, and the Foundation of all the other Physical Sciences; and may be considered as the Key of Nature.—A Science sanctioned by God himself, which so evidently appears in all his Works; whether we turn our Eyes up to the mighty Heavens, or look into the most minute Operations on Earth, we behold every Excellence.—The Mechanist is lost in his Researches; infinite Wisdom appears constantly before him, in all his Contemplations; the utmost of his Sagacity, can only determine a few leading Truths, and confirm what human Labour and Observation have acquired through many Ages.—It has been said, by a Writer on the Creation, that the Muscles of the Human Frame alone, possess more *Geometry*, than all the ARTIFICIAL ENGINES in the WORLD."—*Reynard.*

"GEOMETRY is one of the main Pillars on which the Mathematical Sciences depend; and has engaged the Attention of learned Men, in all civilized Nations, from the Days of Euclid the Founder of the Greek Geometry, who flourished above three hundred Years before the Christian Era. It treats of the Properties of Lines, Angles, Surfaces, and Solids.—It is frequently denominated the Science of Extension, or Magnitude, in Contra-distinction to Arithmetic, which is called the Science of Numbers; and these two Branches are the very Foundation of all MATHEMATICAL KNOWLEDGE."—*Keith.*

"ARITHMETIC is one of the main Pillars of the Mathematics; and Geometry is the other Pillar.—On these two Foundations, all the other Branches are built and supported; and from them they derive their *whole Strength and Evidence.*—These two Sciences, however, are

essentially different; the former considers Numbers, without any Regard to Extension; the latter considers Extension, without any regard to Numbers; but both of them treat their particular Subjects in the most abstract Manner."

"GEOMETRY is of extensive Use in all the common Affairs of Life. Its Principles and Rules are applied to the Measuring of Distances, Superficies, Solids, Lands, Buildings, &c., &c.; and also to the Construction of Maps, Charts, Fortifications," &c., &c.

"GEOMETRY likewise examines the Nature of all plane Figures, such as Triangles, Squares, Parallelograms, Circles, &c.; and such solids as Pyramids, Cones, Cubes, Prisms, Spheres, &c.; compares them together, and finds out their Relation and Properties."

"PLANE GEOMETRY is also the Foundation of the higher Geometry, relating to all sorts of Curve Lines, their Natures, Properties, &c., &c.—In short it is a Science inexhaustible in its Applications, and which knows no LIMITS or BOUNDS."—*Emerson*.

ALGEBRA.

"ALGEBRA is particularly excellent in this, that whereas in Arithmetic, Questions are only resolved by proceeding from given Quantities to the Quantities sought; Algebra proceeds in a retrograde Order, from the Quantities sought, as if they were given, to the Quantities given, as if they were sought, to the End that we may come to a Conclusion or an Equation, from which we may bring out the Quantity required. And, after this Manner, the most difficult Problems may be resolved, the Resolutions whereof, would be sought in vain from COMMON ARITHMETIC."—*Newton*.

"ALGEBRA is a Science which teaches in a general Manner, the Relation and Comparison of Abstract Quantities; by Means whereof such Questions may be solved, whose Solutions would be sought in vain from COMMON ARITHMETIC."—*Simpson*.

"ALGEBRA is a Science of universal Use, in the Mathematics.—Its business is to solve difficult Problems; to find out Rules and Theorems in any particular Branch of Science; and to discover the Properties of such Quantities as are concerned in any Subject we wish to consider.—It properly follows these two fundamental Branches, Arithmetic and Geometry; but it is vastly superior, in its Nature, to both; as it can solve Questions quite beyond the Reach of either of these SCIENCES."—*Emerson*.

"ALGEBRA is one of the most important and useful Branches of the Mathematical Sciences; and may be justly considered as the Key to all the Rest. Geometry delights us by the simplicity of its Principles, and the elegance of its Demonstrations.—Arithmetic is confined in its Object, and partial in its Application; but Algebra, or the Analitic Art, is general and comprehensive, and may be applied with Success, in all Cases where Truth is to be obtained, and proper DATA can be ESTABLISHED."—*Bonnycastle*.

"ALGEBRA, the Logic of Arithmetic, or universal Reasoning, is a Science which far surpasses Arithmetic and Geometry, in point of Application; these two being fundamental Sciences, whilst Algebra not only investigates Rules and Theorems of its own; but by an admirable Ana-

lysis, extends to every Branch of Mathematical Learning; solving with Accuracy, Brevity, and Elegance, the most abstruse and difficult Problems.—It was by the Aid of this Science combined with Geometry, that Newton settled the whole System of the Visible World. Hence, it is one of the most important Studies, at once useful and elegant, which can be pursued during the PERIOD OF EDUCATION."—*Darby*.

FLUXIONS.

THE INVENTION of the *Fluxional Analysis* does more Honour to the Powers of the Human Mind, than perhaps any Discovery of this or any preceding Age; it opens to us a New World, and extends our Knowledge as it were to Infinity; it carries us beyond those Bounds which seem prescribed to our Mental Powers, and leads to Investigations and Results which must otherwise have ever remained in *impenetrable obscurity*."—*Professor Barlow's Dictionary*.

"THE METHOD OF FLUXIONS is of great Use and Certainty; being adapted to the readily *Finding-out* a Proposition by such Approximations as will create no Error in the Conclusion, or in the Demonstration. By the Help of this *New Analysis*, Sir Isaac Newton found-out and demonstrated the most of the Propositions in his *Principia*."—*Holliday's Fluxions*.

"MANY PERSONS are deterred from the Study of Fluxions, by the apparent Abstruseness and Difficulty of the Science; it is therefore highly important, that every Help should be afforded; and in this, as in every other Department of Literature, those Persons are well employed, who by facilitating the Attainment of Knowledge, increase the Number of Students, and thus add to the general Stock of Intellectual Improvement."—"This Work, however, does not profess to be a Complete Treatise; but is intended for the Use of those who are desirous of obtaining such a Portion of Analytical Knowledge, as may suffice to illustrate the Chief Propositions in *Newton's Principia*."—*Dealtry's Fluxions*.

"TO SAY ANY THING in Praise of the Method of Fluxions, or of its Dignity and Rank among the Mathematical Sciences, would be as needless as to describe the Excellency of bright Sunshine above the twinkling Light of the Stars; since any one who is acquainted with the Sciences will allow it to be a Method of Calculation incomparably superior to all other Methods that ever were known or found out; and beyond which nothing further is to be hoped or expected. It lends its Aid and Assistance to all the other Mathematical Sciences, and that in their greatest Wants and Distresses. It opens and discovers to us the Secrets and Receses of Nature, which have always before been locked up in Obscurity and Darkness. To this all the noble and valuable Discoveries of the last and present Age are entirely owing. And, by this Method, Sir Isaac Newton, the worthy Inventor, determined and settled the *System* of the whole *visible World*."

"The Use and Application of *Fluxions* are exceedingly extensive; for Example, in Trigonometry, it teaches the Computation of Sines, Tangents, and Secants; in Arithmetic, the Calculation of Logarithms; in Geometry, drawing Tangents to Curves, finding their Curvatures, their Lengths and Quadratures, the Surfaces and Solidities of Bodies;



in Mechanics and Philosophy, the Investigation of the Centres of Gravity and Oscillation, the Vibration of Pendulums, the Laws of Centripetal Forces, the Times, Velocities, and Spaces described by Bodies acted upon by any Forces; the Motions and Resistances of Bodies in Mediums, &c. &c. These are some of the numberless Instances, wherein Fluxions are applied with such *wonderful Success*."—*Emerson's Fluxions*.

MECHANICS.

"MECHANICS is that Science which treats of the Laws of the Equilibrium and Motion of Solid Bodies; of the Forces by which Bodies, whether animate or inanimate, may be made to act upon one another; and of the Means by which these may be increased to almost any Degree. As the Practical Parts of this Science are closely connected with the Arts and Business of Life; the Construction of *some kind of* Machines must have been understood and practised long before any Theory have been invented, or the Principles of their Action investigated. —The Application of the Science of Mechanics to the various Practical Purposes of Life, leads to many other Branches of Inquiry; such as the Nature and Power of Machinery, the Advantages or Disadvantages of various Methods of Construction, the Strength of different Materials, the Effects of Friction," &c., &c.—*Joyce on Mechanics*.

EXTRACTS FROM EMERSON'S MECHANICS.

MR. EMERSON, in the Preface to his Mechanics, mentions a great Number of Machines; points out their Application to the Practical Purposes of Life; and endeavours to prove, by strong and cogent Arguments, that the Science is nearly as old as the Creation.—He also observes that "It extends through Heaven and Earth; the whole Universe is its Subject.—Not one Particle of Matter, but what comes under its Laws.—For, what else is there in the Visible World, but Matter and Motion; and the Properties and Affections of both these, are the Subject of Mechanics."

EXTRACTS FROM DR. O. GREGORY'S MECHANICS.

DR. GREGORY, in the Preface to his Excellent Treatise on Mechanics, mentions no fewer than Forty-four different Kinds of Machines, that he has described in his Work; and which he says, are highly useful in various Arts, Manufactures, and in the most important Purposes of *Human Life*.—By Way of proving the great Utility of the Science of Mechanics, we shall enumerate them all, in his own Words, viz.—"Air-pumps, balances, bark-mills, barometers, bellows, clocks, cranes in great variety, file-cutters, fire-engines, flax-mills, flour-mills, foot-mills, hand-mills, hydraulic engines of various kinds, hygrometers, kneading-mills, lathes, and the most curious turning apparatus, locks, oil-mills, ordnance boring machines, contrivances for what are called parallel motions, pendulums, pile-engines, planing machinery, presses, and pressure engines, several pumps, pyrometers, Ramsden's dividing machines, saw-mills, scapements, steam-engines, curious and accurate steel-yards, steam-measurers, telegraphs, thermometers, thrashing-mills, tide-mills, watches, water-mills, weighing apparatus, wind-mills, yarn-mills," &c. &c.

EXTRACTS FROM JOYCE'S SYSTEM OF EDUCATION, RECOMMENDING THE STUDY OF THE MATHEMATICS.

"GEOMETRY will enable a person to think justly.—Without it, there is a certain method wanting which is necessary to rectify our thoughts, to arrange our ideas, and to determine our judgments aright.—It is easy to perceive, in reading a book, (even a moral one,) whether the Author be a Mathematician or not.—I am seldom deceived in this observation.

The famous French metaphysician, Malebranche, would not have composed the *Inquiry after Truth*, nor the famous Leibnitz his *Theodicæ*, if they had not been Mathematicians. We perceive in their Productions that Geometrical Order which brings their Reasonings into a small Compass, while it gives them Energy and Method.

Order is delightful; there is nothing in nature but what is stamped with it; and without it there could be no harmony. We may likewise say that the Mathematics are a Universal Science, which connects all the rest, and displays them in their happiest Relations.—The Mathematician, at the first look, is sure to analyse and unravel a Subject or Proposition with justness; but a Man who does not understand this Science, sees only in a vague, and almost always in an imperfect Manner. Apply yourself then to this great branch of knowledge, so worthy of your Curiosity, and so necessary to the Uses of Life; but not in such a degree as to throw you into Absence;—endeavour to be always recollected; whatever may be your studies.—If I were young, and had leisure, I would acquire a more *Extensive Knowledge* of Geometry.—I have always cherished that Science with a particular Predilection.—My turn of mind made me seek, with avidity, every thing that was methodical: and I pay *but little Respect* to those Works which are only the *Exercises of the Imagination*.

We have three Principal Sciences, which I compare to the three essential parts of the human Composition:—Theology, which, by its spirituality, resembles our Soul; the Mathematics, which, by their combination and justness, express our Reason; and Natural Philosophy, which, by its mechanical Operations, denotes our Bodies:—and these three Sciences, (which ought to maintain a perfect Harmony,) while they keep within their proper Sphere, necessarily elevate us towards their *Author, the Source and Fulness of all Light*."

NATURAL PHILOSOPHY.

EXTRACTS FROM VARIOUS AUTHORS, RECOMMENDING THE STUDY OF NATURAL PHILOSOPHY.

"THE BOOKS of Nature and of Revelation, equally elevate our Conceptions and incite our Piety; they mutually illustrate each other; they have an equal Claim to our Regard, for they are both written by the *Finger* of that *God*, who is *Eternal* and *Incomprehensible*."—*Bishop Watson*.

"TO APPRECIATE the Importance of Physics or Natural Philosophy, as an Object of Study to all Persons engaged in Scientific Pursuits; and, indeed, in the present Day, to all who pretend to a liberal Education, we

must take a rapid Glance at the Nature of human Knowledge generally, and at its Bearings on the existing CONDITION OF MANKIND."—*Dr. Arnott.*

"THE STUDY OF Natural Philosophy, is accompanied with great advantages.—It extends Man's power over Nature, by explaining the principles of various Arts which he practises.—It improves and elevates the mind, by unfolding to it the magnificence, the order, and the beauty manifested in the construction of the material World.—It offers the most striking proofs of the Beneficence, the Wisdom, and the Power of the CREATOR."—*Professor Playfair.*

"THE PRACTICAL APPLICATION of any Science, or branch of knowledge, is undoubtedly of the highest importance; and there is hardly any Man, who may not gain some positive advantage in his worldly wealth and comforts, by increasing his stock of information.—But there is also a pleasure in seeing the uses to which knowledge may be applied, wholly independent of the share we ourselves may have in those PRACTICAL BENEFITS."—*Library of Useful Knowledge.*

"THE NOBLEST EDIFICES of the various Sciences, ought to be regarded only as the Threshold to the Temple of the Deity.—Their contemplation shows us that we are surrounded by Miracles in the Natural World, as incontestible, and yet as inexplicable as those which sustain our Belief in the interposition of God, by the Revelation of his Will.—It is thus that our Minds are led to repose in the delightful Conviction, that the God of Nature is the same wise, merciful, and gracious Being that is revealed to us in the *Pages of Inspired Truth.*"—*J. Webster.*

"THE USEFULNESS OF PHYSICS, or Natural Philosophy, is uncommonly great; as it discovers and improves the conveniences of human Life.—As first, for the understanding, explaining, and promoting all human Arts and Sciences; but particularly the Art of Medicine.—Secondly, it purges our minds from a vain and useless admiration of appearances; relieves us from fear and superstition; and places the Divine Wonders, in the clearest Light.—And, thirdly, it leads us directly to know and prove the existence of God, and his providence; and to a right understanding of many of his Attributes, as his *Power, Wisdom, Goodness,*" &c., &c.—*Dr. Musschenbroek.*

"THE CONTEMPLATION of the Phenomena of Nature, as exhibited in the material world, forms one of the most suitable, gratifying, and useful employments of rational Beings.—The Works of Nature present themselves to our notice under different aspects; and require the employment of various methods for their examination. The results of these investigations constitute the different branches of Natural Science.—Nothing promotes knowledge more than steady application and a habit of observation; and the man who blends Religion and Morals with the Elements of Scientific Knowledge, renders an eminent *Service to Society.*"—*Jackson's Lectures on Natural Philosophy.*

"THE DISTINCTION between Chemistry and Physics, which at first may not be always quite apparent; is certain and well founded. They may meet and encroach on each other perpetually; the laws of Physic may frequently be called in to explain phenomena which belong to Chemistry; but they still have distinct provinces in the wide field of Science.

"Among the innumerable substances which nature presents some are essentially of the same character, or composed but of one of element, or particle throughout; such are called simple substances; others being composed of more than one element, are called compound substances. To recognise by analysis or decomposition, what elements enter into the formation of a compound body, to determine by synthesis or recomposition, what bodies will result from particular combinations, describe the peculiar properties of each element, or of each combination of elements, are among the objects of Chemistry. Thus Chemists sort of Inorganic Anatomy, and is called animal, vegetable, and mineral Chemistry, according as it is employed on one or other of these great denominations of Nature.

"But, Physics neglects entirely the examination of the composition and decomposition of bodies; and consequently, the individual which preside over these two classes of Phenomena.—The Student of Physics has his objects ever before his eyes.—The apple which the water which freezes, the liquid which evaporates, the rain, hail, the lightning's glare, and thunder's roll; these and ten thousand Phenomena constantly going on about us; all subject to laws, are unfolded by the *Province of Physics*."—*T. Webster's Elements of Physics*.

"IT HAS BEEN, for a considerable time allowed, by the most intelligent Persons, that among a variety of studies, there are none of greater utility or that afford more real pleasure to a rational mind, than those on Philosophical Subjects.—When it is considered how liable our Senses are to deception, and what wrong ideas are generally formed of the different parts of the Universe, from mere cursory observation, will appear evident that there is an absolute necessity for the dissemination of true *Philosophical Principles*."

"NATURAL PHILOSOPHY is subservient to purposes of a high and noble kind, and is chiefly to be valued, as it lays a sure foundation for Natural Religion and Moral Philosophy; by leading us, in a satisfactory manner, to the knowledge of the Author and Governor of the Universe. To search into his Workmanship; every new discovery to us a new part of his scheme. And, while we still meet, in inquiries, with hints of greater Things, yet undiscovered, the mind is kept in a pleasing anticipation of a further progress; acquiring, at the same time, higher conceptions of that Great Being, whose works are various and hard to be comprehended."

"IT IS A MELANCHOLY CONSIDERATION, that too many Young Persons instead of being zealous of acquiring real and Useful Knowledge, are subject to a kind of Torpor to dwell upon their Minds, and give way to such Slothfulness as may, if they do not rouse themselves from their Lethargy, attend with Fatal Consequences. If any such Persons should peruse these Lessons, let me exhort them to shake off their Carelessness, endeavour to furnish their minds, before it be too late, with a true knowledge of the Works and Wonders of the Creation: let them be assured that such Conduct will produce the happiest Effects; for Philosophical Contemplations will form the safest Bulwark against the insidious Attacks of Atheists: because the principal intention of such inquiries

when duly conducted, is, from a consideration of the effects produced, to correct our ideas with respect to the *Great First Cause*; or, as the Poet has expressed it, 'To look through *Nature up to Nature's God*.'—*Dr. Olinthus Gregory's Astronomical and Philosophical Lessons.*

CHEMISTRY.

EXTRACTS FROM VARIOUS AUTHORS RELATING TO CHEMISTRY.

"CHEMISTRY is the Study of the Effects of Heat and Mixture, with the View of discovering their general and subordinate Laws, and of improving the useful *Arts*."—*Dr. Black.*

"Chemistry is that Science which treats of those Events or Changes in natural Bodies, which are not accompanied by *sensible Motions*."—*Dr. Thomson.*

"Chemistry is a Science by which we become acquainted with the intimate and reciprocal Action which all the Bodies in Nature, have upon each other."—*Fourcroy.*

"Chemical Research conducts to the Knowledge of Philosophical Truth, and forms the Mind to Philosophical Enlargement and Accuracy of Thought, more happily than almost any other Species of Investigation in which the human intellect can be employed."—*Tilloch.*

"Chemistry has been termed, with some propriety, the Anatomy of Matter; and its Object is to discover the component Parts of Bodies; and if necessary, to form them into new Combinations.—It is by the Agency of Heat and Mixture; or in other Words, by the Action of the Particles of one Body upon those of another, that the Chemist is enabled to analyze or decompose the different substances which Nature presents to his view."—*Dr. G. Gregory.*

"Chemistry is the Science which enables us to discover the peculiar properties of all natural bodies, either in their simple or compound state.—The basis of Chemical Science is the analytical examination of the works of nature, and the investigation of the properties and uses of the several substances with which we are acquainted; it should therefore, be the first concern of every Chemical Student to receive nothing as true, but what has actually been proved by Experiment or Analogy. Let him rely upon nothing but facts; and he will be in little danger of forming extravagant or erroneous Opinions. From the present state of chemical knowledge, and the rapid improvements in our Arts and Manufactures, by the judicious application of its principles; it is become desirable that every Youth should be acquainted with its rudiments, and that Chemistry should be made a regular *Branch of Education*."—*Parkes.*

EXTRACTS FROM J. GRIFFIN'S CHEMICAL RECREATIONS, AND EXPERIMENTAL CHEMISTRY, PUBLISHED IN 1838.

"CHEMISTRY is the Science which makes known to us the properties of the component particles of all natural bodies. I speak not only of those *compound* particles which are the result of organization; but of the ultimate, indivisible, or *elementary* particles. It treats of the infinitely various *sorts* of substances, and of the exact determination of their differences. It exhibits the means by which the component parts of compound bodies, can be separated from one another, or by which the

elements of compounds can be made to combine together. In fine, it shows by what contrivances the Corpuscles which constitute the World, can be most *beneficially* applied to the *Service of Man*.

If we consider Chemistry purely as a Science, we shall find no subject better calculated to encourage that generous love of truth which confers dignity and superiority on those who successfully pursue it. There is no science which holds out more interesting subjects of research; and none which affords more striking proofs of the Wisdom and Beneficence of the *Creator of the Universe*. A machine constructed by human art, is admired in proportion to the simplicity of its contrivance, to the extent of its usefulness, and to the niceness of its adaptations. But the works of man sink into nothing when brought into comparison with the works of nature. When we examine the former, every step of our progress is obscured with comparative clumsiness and defect: in contemplating the latter, we behold perfection rise on perfection; and more exquisite wonders still meeting our view.

It is the merit of Chemistry, that by its aid we are enabled to take a minuter survey of the great system of the universe. And we find, so far as our limited powers can comprehend it, that the whole is nicely balanced and adjusted; and that all its changes tend to the most beneficial purposes. Circumstances which, on a superficial view, were seeming imperfections and defects, a closer inspection points out to be real excellencies. In all the singular and surprising changes which every where present themselves, the more closely we observe and examine them, the more do we admire the simple means by which they are accomplished; and the intelligent design and perfect wisdom displayed in the beneficial ends to which they are directed.

To these considerations respecting the usefulness of Chemistry, we may add another, which, at a period when Chemistry is taking its proper place in Schools, as a Branch of General Education, is not without its interest. This consideration is, that Chemistry is a subject qualified to train both the *mind* and the *hands* of young people to habits of industry, regularity, and order. It teaches the doctrine that accurate and extensive observation is necessary for the accumulation of facts; that careful and exact comparison is necessary for the reduction of these facts to general statements; that logical precision is necessary in estimating the relative value of various problematical statements on points where positive information is wanting; that, consequently, the Chemist must study to become capable of judging according to *presumptive evidence*, and in that manner habituate himself to the formation of sound opinions on all subjects that come under his cognizance.

Again, the necessity of observing the most scrupulous and constant regard to *cleanliness* in experimenting, as being indispensable to success, must gradually induce habits of neatness and cleanliness, even in the most *stoutly*; while the equally unavoidable necessity of carrying on the different steps of an operation in an orderly and a cautious manner, must have a corresponding moral influence upon persons of the most careless disposition. Independently, therefore, of any advantages to be hoped for from the possession of the mere facts of Chemistry; setting entirely out of view the applications, either of the principles or the de-

tails of the science to the prospective commercial or scientific pursuits of the Young Student; there is, in the mental and moral discipline which its study affords, high inducements for making CHEMISTRY A STATED BRANCH OF LIBERAL EDUCATION."

EXTRACTS FROM J. C. NESBIT'S OBSERVATIONS ON THE IMPROVEMENTS AND ADVANTAGES OF CHEMICAL SCIENCE AND KNOWLEDGE; PUBLISHED IN THE YEAR 1840.

"THE RAPID ADVANCEMENT which Chemistry has made, since the commencement of the present century, has raised it to a high rank among the First and Leading Branches of Natural Philosophy.

"Previously to the middle of the last Century, Chemistry presented only a vast collection of facts and experiments; the greater part of which appeared to have very little relation or analogy to each other. Some of these Chemical facts or truths have been known from the earliest ages; but the majority of them have been discovered by Philosophers of more modern Times.

"The Labours and Investigations of Bergman, Klaproth, Fourcroy, Lavoisier, Chaptal, Priestley, Cavendish, Dalton, Davy, Wollaston, Thenard, Berzelius, Rose, Turner, Henry, Reid, Thompson, and a host of other Writers and Experimenters, whose names alone are too numerous to mention, have formed this immense assemblage of Truths, into a Science. The bearing and relation of each particular fact is known, with respect to others; and the whole is united in such a manner, and proved to be so intimately connected with the operations of Nature, and the efforts of Art, that the study of Chemistry is at once the most instructive, the most useful, and the most interesting of any of the Physical Sciences.

"It searches into the innermost recesses of Nature; investigates and brings to light the hidden properties of matter; divides it into different kinds, according to its different qualities; and it discovers, explains, and elucidates the actions which different bodies display, when brought within each other's influence. It has a reference to the whole of those actions and properties of matter which are not merely mechanical; and evidently performs a high and striking part in the economy of Nature. It is owing to the effects of chemical laws, that the refreshing dews and rains continually fall; and are again evaporated to be poured afresh upon the earth, in exhilarating showers.

"The action of these Laws is further exemplified in the relations of animal and vegetable Life; for, the vitiated, respired Air of animals, carbonic acid gas, is eagerly consumed by vegetables, and converted to the purposes of their growth; and by a chemical process in their vessels, the carbon is separated from the oxygen, and the latter is given out in large quantities, for the nourishment and support of animals; and thus the atmosphere is continually preserved in a proper state for the subsistence of both.

"In the Operations of Art, the laws of Chemistry are of immense importance, not only in the production of the necessaries and luxuries of life; but also in the creation of that vast mechanical power, by the aid of which this Country has risen to that high and important position which it maintains among the Nations of the Earth.

"The amazing power of the Steam Engine, which gives motion to our various and extensive manufactories; propels with an astonishing velocity, our Railway Trains, to all parts of the kingdom; and enables our Noble Vessels, independently of wind or tide, to navigate the pathless ocean, gradually extending civilization and commerce over the whole Globe, is produced by the chemical action that takes place between the particles of coal and other fuel, and the air which is continually passing through them. Vast quantities of heat, in consequence of this action, are set at liberty; and by its chemical powers, generates the steam which directly gives motion and force to these Stupendous Machines.

"In the Arts of Dyeing and Calico Printing, which are of such great importance in this manufacturing country; the production of the colours, the method of fixing them, their durability, and the beauty of their tints, are all caused by the chemical action of the substances which are employed, on the wool, or on the fabric of the cloth.

"The French, by their superior chemical knowledge, have far excelled us in the production of some of the finer and more delicate tints; for in France, almost every artisan is a Chemist, while in England, the workmen are generally ignorant even of the very rudiments of Chemistry.

"If then, we wish not to be superseded either by France or any other foreign Nation, it will be wise to give to all those who intend to engage in the above Arts, a proper knowledge of Chemical Science. This will enable them to analyze the various substances that are employed, ascertain their properties, and discover their reciprocal action upon each other; and, besides the improvement that might be made in the appearance of the colours, no doubt a considerable saving might be effected in the expenditure.

"Indeed, Chemistry ought to be made a leading and regular Branch of Education; as, upon the principles which it develops, almost every Art and Manufactory are more or less depending, for their Establishment, their Improvement, or for their SUCCESSFUL AND BENEFICIAL PRACTICE."

MATHEMATICAL, PHILOSOPHICAL, CHEMICAL, AND OTHER SCIENTIFIC WORKS.

THESE WORKS have all been written by Men of known and acknowledged Talents and Abilities; and illustrate the Principles and Properties of the various Subjects on which they treat, with peculiar Simplicity, Accuracy, and Perspicuity. They also contain Rules and Directions for applying these Principles and Properties to the Practical Affairs of Real Life and Business; and will form an Excellent and a Valuable Mathematical, Philosophical, Chemical, and Scientifical Library; and we may likewise add, that many of them may be purchased at very moderate Prices, particularly in LONDON. (See Pages 43 and 47.)

ARITHMETIC.—Walkingame, Peacock, Guy, Melrose, Vyse, Joyce, Goodacre, Molineux, Morrison, Cary, Thomson, Tinwell, Hutton, Bonny-

castle, Keith, and Nesbit. — Alexander Malcolm wrote an Elaborate Treatise on Arithmetic, published in 1730; and which is now a very scarce Work.

Under the Head of Arithmetic, we may also mention Morgan's Treatise on Assurances and Life Annuities; Milne's Treatise on Life Annuities and Assurances; and Jones's Work on Annuities and Reversionary Payments, lately published by the Society for Promoting Useful Knowledge.

BOOK-KEEPING.—Jones, Foster, Morrison, and Dr. Kelly. — We must also recommend Mortimer's Commercial Dictionary, M'Colloch's Commercial Dictionary, Tate's Treatise on Foreign Exchanges, Freese's Cambist's Compendium; and likewise Dr. Kelly's Universal Cambist and COMMERCIAL INSTRUCTOR.

MENSURATION.—Robertson, Fletcher, Peacock, Hutton, Bonnycastle, Keith, Beckett, and Nesbit. — Dr. Hutton's Octavo Treatise on Mensuration, Price Eighteen Shillings, is a Valuable Work, for YOUNG MATHEMATICIANS.

GAUGING.—Leadbetter, Moss, Turner, Fletcher, Hutton, Symons, Jones, Hey; and Nesbit's and Little's PRACTICAL GAUGING.

LAND SURVEYING.—Dix, Davis, Crocker, Hutton, Stephenson, Ainsley, and Nesbit.

Also Major Jackson's Course of Military Surveying. — We may likewise recommend Simms's Principles and Practice of Levelling; his Treatise on Mathematical Instruments, used in Surveying, Levelling, Astronomy, &c.; and his Treatise on Mathematical Drawing Instruments. — Jones's Geometrical and Graphical Essays, and General Description of Mathematical Instruments, is likewise a valuable Work; and contains much useful Information, on a great Variety of Subjects.

TRIGONOMETRY.—Simpson, Emerson, Woodhouse, Bridge, Hind, Lardner, Vince, Snowball, Gregory, Young, Hutton, Bonnycastle, and Keith. — Here we must recommend Dr. Hutton's Excellent Mathematical Tables, containing Logarithms, Sines, Tangents, Secants, Versed Sines, &c., &c. — Young's Mathematical Tables, containing Logarithms, Sines, and Tangents, is a very useful SCHOOL BOOK.

NAVIGATION.—Robertson, Norie, Bowditch, Mackay, and Hamilton Moore's Excellent and Practical Treatise, improved by J. F. Dessiou. — Edward Riddle, of Greenwich, has also published a very Good and Useful Practical Treatise on Navigation and Nautical Astronomy. — We must also mention the Nautical Almanac, a Valuable Work, published under the Direction of the ASTRONOMER ROYAL.

ASTRONOMY.—Keill, Fergusson, Emerson, Gregory, Bonnycastle, Squire, and Guy. — Mr. Guy's excellent little Work, is well adapted for the Use of Schools; and so are Dr. Gregory's beautiful Astronomical and Philosophical Lessons.

GEOMETRY.—Euclid's Elements by Dr. Simson, are the foundation of all other Works on this Subject. — Excellent Treatises, however, have been written by Emerson, Simpson, Keith, Bonnycastle, Playfair, Leslie, Reynard, Young; and Bradley's Practical Geometry, published by the Society for Promoting Useful Knowledge. — Mr. Young's Work is a very convenient size for Schools; and is particularly founded on Simson's, and on Playfair's Euclid. — Dupin's Geometry, translated into English, by Dr. Birkbeck, is an EXCELLENT PRACTICAL WORK.

ALGEBRA.—SIR ISAAC NEWTON'S *Universal Arithmetic*;—Saunderson, Maclaurin, Euler, Emerson, Simpson, Bonnycastle, Lardner, Wood, Hind, Bridge, Bland, Young, Hall, Darby; and Lacroix, lately translated into English, by W. H. Spiller.—We may also mention Cole's *Conversations on Algebra*, as a very useful Work for Beginners.

The Excellent John Kersey, who was born in Oxfordshire, in 1616, wrote a very valuable Work on Algebra, in which he greatly amplified and illustrated Diophantine Problems. This Book was published in 1673; and has now become an extremely scarce Work.

Leonard Euler has, since that Time, rendered this Department of Algebra, as simple and as explicit as can be expected, from the abstract Nature of the Subject.—Euler was born at Basil, in 1707; and died in 1783, at Petersburg, where he had spent a great Portion of his Life.

FLUXIONS.—SIR ISAAC NEWTON, the Inventor; Maclaurin, Emerson, Stone, Simpson, Holiday, Rowe, Vince, and Dealtry.—Rowe's Work is well adapted for Beginners, as it is considered the most easy Introduction to the Science.

DIFFERENTIAL AND INTEGRAL CALCULUS.

Dr. Lardner's *Differential and Integral Calculus*; T. G. Hall's *Differential and Integral Calculus*; Young's *Differential and Integral Calculus*; Miller's *Differential Calculus*; Hind's *Differential Calculus*; Peacock's *Differential and Integral Calculus*; Levy's *Differential and Integral Calculus*; De Morgan's *Differential and Integral Calculus*; Boucharlat's *Differential and Integral Calculus*; and Lacroix on the *Differential and Integral Calculus*.

MECHANICS.

Emerson's *Principles of Mechanics*; Ferguson, greatly improved by Dr. Brewster; Wood, Moseley, Nicholson, Bridge, Brunton, Young, Whewell; and Dr. Gregory's *Theoretical and Practical Mechanics*, in Three Volumes, Octavo.—This is an Elaborate and a Valuable Performance.—Marrat's *Introduction to the Theory and Practice of Mechanics*, is a useful and a valuable Work; and well adapted for Schools.

We must also mention Tredgold on the *Strength of Metals*; Barlow's *Experiments on the Strength of Iron*, and his *Treatise on the Strength of Timber*; and Hodgkinson on the *Strength of Materials*.

GENERAL MATHEMATICS.

SIR ISAAC NEWTON'S *PRINCIPIA*;—Dr. Hutton's *Mathematical and Philosophical Dictionary*, his *Course of Mathematics* by Dr. Gregory, his *Mathematical Tables*, his *Diarian Miscellany*, his *Miscellaneous Mathematica*, his *Mathematical Tracts*, and his *Principles of Bridges*;—Dr. Gregory's *Mathematics for Practical Men*;—Simpson's *Mathematical Dissertations*, his *Miscellaneous Tracts*, his *Select Exercises*, and his *Laws of Chance*;—Dodson's *Mathematical Repository*;—Dr. Simson's *Conic Sections*;—Emerson's *Conic Sections*, *Curve Lines*, and *Arithmetic of Infinities*;—Leybourn's *Mathematical Questions*, in the *Lady's Diary*;—Ludlam's *Elements of Mathematics*;—Williamson's *Mathematics*;—Professor Barlow's *Mathematical and Philosophical Dictionary*, his *Mathematical Tables*, and his *Theory of Numbers*;—Nicholson's *Course of Pure and Mixed Mathematics*;—Cape's *Course of Mathematics*;—Hamilton's *Conic Sections*;—and *Two Volumes of Mathematics*, published by the Society for Promoting Useful Knowledge.

NATURAL PHILOSOPHY.

OUR WORKS on Natural Philosophy are both Numerous and Excellent; some of them, however, are *scarce*, and can only be procured at OLD BOOK SHOPS, of which we have many in LONDON.

Martin's Gentleman and Lady's Natural Philosophy, and his System of Newtonian Philosophy;—Musschenbroek's Natural and Experimental Philosophy, by Colson;—Gravsand's Newtonian Philosophy, by Stone;—Worster's Principles of Natural Philosophy;—Count Rumford's Philosophical Essays;—Adams's Lectures on Natural and Experimental Philosophy, by Jones; and his Astronomical and Geographical Essays, by Jones;—Dr. G. Gregory's Economy of Nature, his Dictionary of Arts and Sciences, and his Lectures on Experimental Philosophy, Astronomy, and Chemistry;—Jackson's Lectures on Natural Philosophy, by Broader;—J. Webster's Mechanical and Chemical Philosophy;—Nicholson's Natural Philosophy;—Hack's Lectures at Home;—and Keill's Introduction to Natural Philosophy.

Moffatt's Principles of Natural Philosophy;—Tomlinson's Natural Philosophy;—Young's Lectures on Natural Philosophy;—Wesley's Compendium of Natural Philosophy;—Partington's Natural Philosophy, and his Treatise on the Steam Engine; Steward's Work on the Steam Engine, and his Anecdotes of the Steam Engine;—Lardner's Lectures on the Steam Engine;—Dodd on the Steam Engine;—Farey on the Steam Engine;—Tredgold on the Steam Engine;—Alderson on Steam and the Steam Engine;—Arnott's Elements of Physics;—Brewster's Natural Magic;—Enfield's Natural Philosophy;—Ferguson's Lectures on Select Subjects;—Euler's Letters on Natural Philosophy;—Herschel's Discourse on Natural Philosophy;—Imison's Elements of Science and Art, by Webster;—Robison's System of Mechanical Philosophy;—Rutherford's System of Natural Philosophy;—and Bradley's Philosopher, or Mechanic and Artist's Companion.

DR. HUTTON's Recreations in Mathematics and Natural Philosophy;—D. H. Mahau's Civil Engineer;—Millington's Engineering;—Pambour's Theory of the Steam Engine;—Wood's Practical Treatise on Railroads;—Illustrations of Mechanics;—Illustrations of Experimental Philosophy;—Illustrations of Natural Productions, useful in the Arts and Manufactures;—Elementary Instruction, by Shepherd, Joyce, and Carpenter;—M. R. J. Haüy's Natural Philosophy, translated from the French, by Dr. Olinthus Gregory, and Dr. G.'s Astronomical and Philosophical Lessons;—Cavallo's Natural and Experimental Philosophy;—Leslie's Elements of Natural Philosophy;—Playfair's Outlines of Natural Philosophy;—Four Volumes of Natural and Experimental Philosophy, in the Library of Useful Knowledge;—and Wright's Commentary on NEWTON'S PRINCIPIA.

JOYCE's Letters on Natural Philosophy, his Introduction to the Arts, and his Scientific Dialogues;—Philosophy in Sport made Science in Earnest;—Powell's History of Natural Philosophy;—Tom Telescope's Newtonian Philosophy;—Mitchell's Natural Philosophy;—Bakewell's Philosophical Conversations;—Comstock's Natural Philosophy by Lees—and T. Webster's Elements of Physics.

The last TEN WORKS are admirably adapted for the Improvement of Youth ; and cannot be too highly recommended to Schools.

OPTICS.

BARLOW on Optics, and Herschel on Light ;—Brewster on Optics ;—also on Optical Instruments ;—Phillips's Treatise on Optics ;—Wood's Optics ;—Stack's Optics ;—Harris's Optics ;—Optics, by the Society for the Diffusion of Useful Knowledge ;—Brewster's Treatise on the Microscope ;—Kitchiner's Economy of the Eyes ;—Walker's Philosophy of the Eye ; Baker on Microscopes ;—and Smith's Complete System of Optics, in Four Books ; namely, a Popular, a Mathematical, a Mechanical, and a Philosophical Treatise, in Two Quarto Volumes.

CHEMISTRY.

WORKS ON CHEMISTRY.—SIR H. DAVY'S CHEMICAL PHILOSOPHY, and his AGRICULTURAL CHEMISTRY ;—DALTON'S CHEMICAL PHILOSOPHY ;—Thenard's Chemical Analysis ;—Gray's Operative Chemist ;—Parke's Chemical Catechism, and his Chemical Essays ;—Accum's Chemical Tests ;—Faraday's Chemical Manipulation ;—Henry's Elements of Chemistry ;—Turner's Elements of Chemistry ;—Reid's Elements of Practical Chemistry, and his Chemical Text Book ;—Brande's Elements of Chemistry ;—Thomson's Treatise on Chemistry, and his History of Chemistry ;—Ure's Dictionary of Chemistry ;—Bachoffner's Chemistry applied to the Fine Arts ;—Rose's Chemical Analysis ;—Kobell's Chemical Analysis, published by Griffin, Glasgow ;—Liebig's Organic Chemistry, as applied to Agriculture and Physiology ;—Berzelius sur la Theorie des Proportions Chimique, et son Traité de Chimie ;—Dumas' Traité de Chimie appliquée aux Arts ;—Mitcherlich's Practical and Experimental Chemistry, by DR. HAMMICK.

We may also particularly mention the following Works on Chemistry, as being of a convenient Size, and well adapted for Schools :—Dr. Reid's Rudiments of Chemistry ;—Parke's Elementary Treatise on Chemistry ;—Griffin's Chemical Recreations ;—The Hand Book of Chemistry, by G. H. Caunter ;—Recreations on Chemistry, by T. Griffiths ;—Alphabet of Chemistry, by J. Rennie ;—and Conversations on Chemistry, in Two very neat Volumes, by MRS. MARCET.

We do not see why all the Philosophical Knowledge should be confined to Gentlemen ; and we hope the Ladies will turn their Attention to CHEMISTRY, during their *leisure* Hours, when they have had such a Bright Example set them by MRS. MARCET.—We must also recommend MRS. SOMERVILLE'S Connexion of the PHYSICAL SCIENCES, as a Work well adapted for the Improvement of YOUTH.—Here we have another Fine Example which ought to induce the LADIES to turn their Attention to the Study of NATURAL PHILOSOPHY.

REMARK.—We will take the Opportunity of Stating that Mrs. Marcet, and Mrs. Somerville are not the only Literary Ladies that England has produced ;—we can record the Names of Carter, Rowe, Montague, Talbot, Seward, Chapone, Taylor, Barbald, Edgeworth, Wakefield, More, Astell, Cockburn, Gierson, Lady Jane Grey, and the four celebrated daughters of Sir Anthony Cooke, preceptor to Edward the Sixth ; and many others might be named who have distinguished themselves in the Walks of Literature and Science.—Indeed, there can be no doubt that the Natural Talents of Ladies are fully equal to those of the other Sex ; and it is only the different Modes of Education that produce different RESULTS.

ELECTRICITY, GALVANISM, MAGNETISM, HEAT, &c.

DR. PRIESTLEY's History of Electricity;—Dr. Franklin's Experiments on Electricity;—Beccaria on Electricity;—Singer's Elements of Electricity;—Cuthbertson on Electricity and Galvanism;—Cavallo on Electricity;—Murphy on Electricity;—Lunn on Electricity, Roget on Galvanism, Barlow on Magnetism, in the *Encyclopædia Metropolitana*;—Heat, Electricity, Galvanism, Magnetism, and Electro-Magnetism, published by the Society for the Diffusion of Useful Knowledge;—Lardner on Heat;—Thomson on Heat and Electricity;—Cumming's Translation of Demondferrand's Manual of Electro-dynamics;—Cavallo on Magnetism;—Faraday's Researches in Electricity;—Leslie on Heat;—Thomson on Heat and Electricity;—and DALTON ON HEAT.

Becquerel's "*Traité Experimental de l'Electricité, et du Magnetisme*;"—Ampere's "*Theorie des Phenomenes Electro-Dynamique*," and his "*Recueil d'Observations Electro-Dynamique*."

BOTANY.

BOTANY is that branch of Natural History which treats of the vegetable Productions of the Earth; arranges them in their proper Classes, describes their various Forms and Structures; notices the different Countries in which they are produced, and points out their Uses and Virtues, as applied in Building, Cabinet-Making, Dyeing, Medicine, &c. &c.

WORKS ON BOTANY.

The following Works on Botany, may be read with Advantage, by our Juvenile Friends; namely, *The Woodland Companion*, or a Brief Description of British Timber Trees;—An Introduction to Botany, by Priscilla Wakefield;—J. J. Rousseau's Letters on Botany, Translated by T. Martyn;—Evelyn's *Sylva*, by Dr. Hunter;—Dr. Thornton's Family Herbal;—and a Work of very superior Merit, entitled *An Introduction to Physiological and Systematical Botany*, by Sir James Smith, F.R.S.

WE MAY also recommend, as very useful Works, and of a convenient Size for Young Persons;—Withering's *Botany of British Plants*, by Macgillivray;—Smith's *Introduction to Botany*, by Professor Hooker;—Thornton's *Introduction to Botany*;—Main's *Popular Botany*;—Drummond's *First Steps to Botany*;—Rennie's *Alphabet of Botany*;—Lindley's *Introduction to Botany*;—Dr. John's *Botany*;—and Mrs. Marcet's *Conversations on VEGETABLE PHYSIOLOGY*.

GEOLOGY.

GEOLOGY is that Department of Natural Philosophy which treats of the Construction, Composition, and Arrangement of the various Materials that form the external Crust of the Earth; such as Mountains, Rocks, Metallic Ores, Earths, Stones, and other Minerals.

This Study has for its Object, to unfold the Structure of the Globe; to discover by what Causes its Parts have been

arranged; from what Operations have originated the general Stratification of its Materials; the inequalities with which its Surface is diversified; the immense number of different Substances of which it is composed; and the Fossils or Organic Remains which are found embedded in them.

This Science is of great importance; as it opens to the View of the Student, the past as well as the present State of the **TERRESTRIAL GLOBE**; and brings to Light, not only Organic Remains, but also the **HIDDEN TREASURES OF THE EARTH**.

REMARKS ON GEOLOGY.

GEOLOGISTS have differed much in their Opinions, respecting the Means that Nature has employed, in effecting the Constitution and Stratification of the Earth; and in producing the various Changes which it has undergone, at different Times.—Accordingly, many elaborate, fanciful and absurd Theories have been given to the World, by Burnet, Woodward, Whiston, Hutchinson, Buffon, Worthington, Whitehurst, Williams, Kirwan, Cuvier, Werner, Dr. James Hutton, of Edinburgh, &c. &c.

All these different Geological Theories of the Earth, have been reduced to Two, which are denominated the Plutonic and Neptunian Theories.—The First is the System of Hutton, who supposes that all the Rocks, Stratifications, and Crystalizations of the Earth, were produced by subterranean and Central Heat; and in this Opinion he is supported by Professor Playfair, Sir James Hall, and several other Geologists.

The second is the Theory of Werner, who supposes that all the superficial Parts of the Globe, were once in a State of aqueous Solution; and that primary and transition Rocks, and other Substances, were formed by Chemical Deposition; and, in this Conclusion, he is followed by Saussure, Kirwin, and many other Philosophers.—These Two Theories are frequently denominated the Huttonian and Wernerian Systems; and it may be added, that the general Opinion is much in Favour of the Wernerian Theory.

Such are the Outlines of these Two Prominent Theories of the Earth; each has its strenuous Advocates; and the great Question is, whether Fire or Water has been the most concerned in the Constitution and Arrangement of the different Materials that compose the Terrestrial Globe.—If we look with an unprejudiced Eye, upon the various Rocks, and mineral Productions, and at the appearance of the different Stratifications that are presented to us, we may fairly draw the Conclusion, that both FIRE and WATER have been the *Great and Mighty Agents* which have produced the present FORMATION OF THE EARTH.

This Conclusion appears more decisive, when we closely examine the Nature, Character, and Position of Clays, Gravels, Rocks, and other Strata and Substances forming the Solid Parts of the Globe.—The lowest Beds of the mineral Crust of the Earth, do not contain Fossils; and are, therefore, generally called the primitive or primary Rocks; as they are supposed to have been formed before the Creation of Things that had Life.—The unstratified Rocks are also destitute of Organic

Remains, as might be expected; for they were evidently produced by the violent Action of Fire.—But all the Layers or Beds of Clay, Sand, Gravel, and the stratified Rocks contain great Quantities of Organic Remains; some of which are most remarkable, for their Size and Character; and, in Consequence of the Species to which they belonged, being now entirely extinct.

Now, there can be no doubt that all the different Layers and Beds of Clay, Sand, Gravel, and the stratified Rocks, were once in a state of aqueous Solution; and were formed at different Times, and at long Intervals.—All these contain immense Quantities of Fossils and Organic Remains, which must have been deposited in the Beds and Rocks, at the Time of their Formation. These Remains and Petrefactions consist of Plants, Trees, Birds, Fishes, Shells, Turtles, Fish Bones and Teeth, Corals, Reptiles, Serpents, Crocodiles, &c. &c.; some of which are of immense Size.—The Bones of many of these Relics, prove that the Animals to which they belonged, exceeded in Size, our largest Elephant, Rhinoceros, Hippopotamus, Crocodile, Boa Constrictor, Ostrich, and Cassowary.

THE PERIOD when the DILUVIUM was deposited, being that immediately preceeding the existing Order of Things, on the Earth's Surface, is marked by the Remains of Animals, many of which still exist, while others are extinct. The chief Evidence, on this point, is derived from Bones, and Fragments of Bones, found in Caves and Caverns which are supposed to have served, about the time of the diluvial Action, as Retreats for Hyænas and other Beasts of Prey.—The Cave at Kirkdale, near Kirby Moor Side, in Yorkshire, discovered a few Years ago, was found to contain Remains of Twenty-three Species; namely, Hyæna, Tiger, Bear, Wolf, Fox, Weasel, Elephant, Rhinoceros, Hippopotamus, Horse, Ox, three Species of Deer, Hare, Rabbit, Water-rat, Mouse, Pigeon, Raven, Lark, and a Species of Duck and Partridge. — The Bones, in general, were broken into angular Fragments or Chips; and were all more or less decayed, though the gelatinous Matter yet remained in some of them. They were covered by a Layer of Mud about a foot deep, the Nature of which led to the Supposition that it must have been deposited during the Action of the DILUVIUM; and that it had, in a great Measure, preserved the Bones from Decay.

DR. BUCKLAND has shown, by reasoning which will not be easily controverted, that the Cavern had been a Den of Hyænas, previously to the Universal Deluge; and that the Bones of their Prey, with the Hyænas themselves, had been entombed, in the Cave, by that Event.—This Cave was discovered in July, 1821, with its Mouth entirely warped or stopped up; consequently, if Dr. Buckland be right in his conjectures, these Remains must have been buried there, about 4180 YEARS.

LONDON and its District, to a considerable Extent, overlay Beds of Gravel and Sand, beneath which is a Layer of stiff blueish Clay, varying considerably in thickness; sometimes from sixty or seventy, to six or seven hundred feet. Many varieties of Shells are embedded in the London Gravel and Clays; and the Remains of a Crocodile, a Sword-fish, a Saw-fish, Turtles, the Bones of Elephants, Oxen, Deer, &c. &c., have been found in the Neighbourhood of the Metropolis.

Large Masses of Wood, are also embedded in this Strata; entire Branches and Stems of Trees, several feet in Length, are sometimes dug out, drilled in every Direction, by Shipworms.—The Tubes and Shells of these Borers, are found still remaining in the cylindrical hollows of the Wood; and have a very singular Appearance.—These are of the Species of Worms that, at present, do so much Injury to Piles, Ships, &c. &c.; to prevent which, it is necessary to cover the Bottoms of Vessels with Sheets of Copper.

Besides the Relics we have mentioned, many others have been found in different Parts of England; and in Scotland, Ireland, France, Germany, Norway, Sweden, Russia, Siberia, the East Indies, and in North and South America; indeed, the whole Globe abounds with Fossil-Shells, Relics of Animals, and other ORGANIC REMAINS.

THE UNIVERSAL DELUGE.

THE WATERS OF THE UNIVERSAL DELUGE, generally called “Noah’s Flood,” would produce great and overwhelming Changes and Effects on the Surface of our Globe.—They would demolish every Building;—tear up Trees and Rocks;—lay bare the Hills and the Mountains;—reduce a great Portion of the upper Strata, to a State of aqueous Solution;—form various and numerous Stratifications;—deposit the Wreck of Nature, in Rivers, Lakes, and Valleys;—carry Part of the Animals which inhabited the Land, Rivers, and Lakes, into the Seas;—and lodge the Tenants of the Great Deep, on the Land, and in Valleys, Rivers, and Lakes.

In retiring from the Earth, the Waters would form Valleys, and the Beds of Rivers;—transport immense Rocks, Stones, Trees, and other loose Substances, to great Distances from their original Situations;—make miscellaneous Deposits in Chasms, Caves, and Caverns;—and leave behind them Bogs, Morasses, and Quagmires.—In many of these, have been found Nutshells, Fossils of various Kinds, large and small Trees, the Bones of numerous Animals; and other Organic Remains, which it is natural to suppose, have lain there embedded, ever since the Universal Catastrophe.

ALL THE EFFECTS, however, which we have mentioned, and which would be produced by the Universal Flood, are not sufficient to account for the present external and internal Appearances of the Crust of the Earth; because the various Stratifications were evidently formed at different Periods, as they consist of very different Materials; and that every Bed or Stratum, would require a great length of Time to form and complete its Deposition, in the manner that we now find each of them arranged in the Bowels of the Earth.

We must not, however, forget to take into Consideration the effects that would be produced, in the Old World, by the Antediluvian Seas, Rivers, and other Waters; to their Action we may fairly attribute the Depositions of some of the lower Strata of the Earth; and also many of the Sandstone and Limestone Formations, with their numerous Organic

Remains.—Nay, we may even imagine that the Beds of the Seas might be changed, at the Deluge; and that our present Continents might have formed the Bottoms of the ANTEDILUVIAN OCEANS.

THAT THIS GLOBE was created by the ALMIGHTY FIAT, without any *Secondary Cause*, is a Proposition which cannot be controverted; and it is equally certain that the MAKER impressed Chemical, Mechanical, and Natural Laws, upon the various Materials of which it is composed; for we see these Laws in constant, active, and effective Operation; and we also know that they have produced many and mighty Changes in our Planet, since it came from the hand of the ALMIGHTY CREATOR.

OBSERVATION.

A LITTLE VARIATION in the Position of the Axis of the Earth, would, at present, produce a dreadful Desolation; for it is evident that if the North Pole was depressed, the South Pole would be elevated; and the Waters would retire from some parts of our present Seas and Oceans, and overwhelm Islands and Continents.—It may also be observed, that if the Rotation of the Earth, on its Axis, was retarded but for a single moment, the Atlantic Ocean would deluge Europe, Africa, and Asia; and America would be engulfed by the PACIFIC OCEAN.

NOTE.—Some Philosophers have conjectured, that the South Pole was, in some Age of the World, elevated; and the North Pole depressed.—This would, at once, account for many of the Appearances with which we meet, on the Earth's Surface; and also for many of the Organic Remains, and the different Strata, that are found beneath its Surface.

EXTRACT FROM HIGGINS'S GEOLOGY.

"EVERY PERSON who has taken the slightest Notice of Geological Phenomena, must have observed that immediately beneath the vegetable Soil, Beds of Gravel, or Sand and Clay, with rounded Pebbles, are frequently found.—These Beds are composed of the Detritus, or Destroyed Materials of older Rocks; and are called, by Geologists, Diluvium. Their almost universal Distribution, and their Constitution, forcibly lead us to the Conclusion, that they were produced by a Universal Deluge. No Fact in Geology is, in our Opinion, more evident than that after all the Strata which compose the Crust of our Globe, were formed, the entire Earth was overwhelmed by a Universal Flood.—Where the Waters necessary to deluge the Earth, were obtained, is perhaps difficult to conceive; "but it is less extraordinary," says Mr. Greenough, "that Water should have stood, at some former Period, at a height exceeding that of our highest Mountains, than that Strata should have been formed without a Precipitate, that Gravel should have been rounded without Attrition, or Valleys excavated without a Flood."

NOTE.—Taking only Natural Causes into Consideration, we do not see any Difficulty that could arise for want of Water.—We must recollect that nearly Two-Thirds of our Globe is covered with this Element;

and it has been calculated, that if the Waters were equally distributed over the Whole Earth, they would cover the highest Mountains, to a very considerable Depth.—But we must remember, that God ordained this Flood; and that, “All the Fountains of the Great Deep were broken up, and the WINDOWS of HEAVEN WERE OPENED.”

EXTRACT FROM THE REV. THOMAS STACKHOUSE'S HISTORY OF THE BIBLE.

“MOSES ASSURES us, that the Waters prevailed fifteen Cubits above the highest Mountains; let the Mountains themselves be appealed to for the Truth of this Assertion.—Examine the highest Eminences of the Earth, and they All, with one accord, produce the Spoils of the Ocean, deposited upon them on that Occasion; the Shells and Skeletons of Sea-fish and Sea-monsters, of all kinds.—The Alps, the Apennines, the Pyrenees, the Andes, and Atlas, and Ararat; every Mountain of every Region under Heaven, from Japan to Mexico, all conspire in one uniform, universal Proof, that they all had the Sea spread over their highest Summits.—Search the Earth, and you will find the Moose Deer, natives of America, buried in Ireland; Elephants, natives of Asia and Africa, buried in the midst of England; Crocodiles, natives of the Nile, in the heart of Germany; Shell-fish, never known in any but the American Seas, together with entire Skeletons of Whales, in divers Countries; and, what is more, Trees and Plants of various Kinds, which are not known to grow in any Region under Heaven.—All which are a Perfect Demonstration that Moses's account of the DELUGE is INCONTESTABLY TRUE.”

NOTE.—MOSES says, “Fifteen Cubits upwards, did the Waters prevail; and the Mountains were covered.”—There were Two Cubits in use among the Hebrews; one Eighteen Inches; and the other 21.888, or nearly 22 Inches.—If we take the former, the Waters would prevail to the height of 22 Feet, 6 Inches; and if we take the latter, at 22 Inches; then 27 Feet, 6 Inches, would be the Depth to which the Waters would cover the tops of the highest MOUNTAINS.

OBSERVATIONS ON NOAH'S ARK.

MANY OBJECTIONS have been raised relating to the Size of Noah's Ark, as not being large enough to contain Noah and his Family; and all the Animals, with Sufficient Food, for Twelve Months; but very few Persons have ever thought of calculating its Tonnage, from the given Dimensions.

Now, as it has not been ascertained which Cubit was used, in building the Ark, we have a right to take the larger; namely, 22 Inches, as being best calculated for our purpose, in making the Ark of the greatest possible Burden.

According to Genesis, Chapter the Sixth, and Verse the Fifteenth, the Length of the Ark was 300 Cubits, equal to 550 Feet; the Breadth 50 Cubits, equal to 91 two-thirds Feet; and the Height 30 Cubits, equal to 55 Feet; and hence we find the Burden of the Ark, to have been 79,226 Tons.—Taking a First-Rate-Man-of-War, at 2,000 Tons; the Ark would have the Capacity or Stowage of THIRTY-NINE of such Ves-

sels; and hence it appears that Noah's Ark was much the **LARGEST SHIP EVER BUILT.**

If we take the Cubit at 18 Inches; then the Length of the Ark would be 450 Feet, its Breadth 75 Feet, and its Height 45 Feet; and hence we find its Burden to be 43,393 Tons, equal to that of **TWENTY-ONE SHIPS OF WAR.**

The preceding Calculations will evidently prove that there was ample Room in the Ark, for all its Inhabitants, together with their various Provisions; even, if we take the lower Estimation of its Capacity; for Twenty-one Ships of War, are capable of carrying an immense Quantity of Provisions, Ordinance, and Ammunition, besides their Compliment of Seamen.

BUFFON has reduced the Quadrupeds to about 250 Species; and it is very probable that some of the larger Animals, that inhabited distant Parts of the Globe, were not taken into the Ark; and this Supposition may account for the Extinction of several Species, the Remains of which Geologists have found buried in the Bowels of the Earth; such as the Mammoth Mastodon, Mososaurus, Ichthyosaurus, Plesiosaurus, Fish Lizard, and many others.

CUVIER, by his splendid Researches, has discovered and described between forty and fifty Species of Animals, most of them Beasts of Prey, which are now extinct; besides several Reptiles, and an immense Number of Shells, among which are the different SPECIES OF AMMONITES.

MODERN GEOLOGY.

MODERN GEOLOGISTS are nearly all of Opinion that many of our Rocks, Mountains, and Islands, have been raised by the Force of subterranean Fires;—that other Rocks and Islands have been formed in the Sea, by Coral Animalcules;—that the Earth has been the Subject of a Universal Deluge;—that our Sandstone Formations, and other different Strata, have originated from aqueous Deposits;—that many of our Limestones are made up entirely of minute Fragments of Shells and Coral, or other calcareous Sand, cemented together;—that some of the Inequalities of our Globe, are owing to the Action of Volcanoes, and Earthquakes;—that our highest Lands have, at sometime, been the Beds of Seas and Oceans;—and, **ABOVE ALL**, that the Crust of our Planet, as we now find it, has been formed at various Periods;—and that successive Lapses of Time have intervened, between the different FORMATIONS.

OBSERVATIONS ON STRATIFICATIONS, ROCKS, &c. &c.

BY THE WORDS STRATIFICATION, and Strata, our Young Readers are not to understand, that the different Beds or Layers of Sand, Gravel,

Clay, &c., &c., extend regularly round the Globe, like the Coats of an Onion; for this is by no means the Case.—In one large District, we find Beds of Sand, Gravel, Clay, &c., resting upon Limestone; but in another District we may, perhaps, find Layers of quite different Materials, as mixed Earths, Sandstone, Coal-shale, with the Impressions of Ferns, Leaves, &c. &c.; then Coal, with petrified Trees; Iron Stone, containing Shells, &c. &c.

In a third Portion of the Earth's Crust, we may pass through Beds of Gravel, Sand, Marl; Chalk, containing Flints, Shells, Plants, &c., &c.; Blue Clay, and Clay Iron Stone, with Shells, Fish, Crocodiles, &c. &c.; Sandstones, with Plants, Shells, Reptiles, Birds, &c. &c.; Limestones and Marl, containing Wood, Corals, Shells, Fish, &c. &c.

These different Stratifications occur at various Depths from the Earth's Surface; and certainly indicate that they were formed at different Periods; and by Depositions of various Kinds of Materials.—In the different Strata of the Earth, there are sometimes, found Falls Breaks, or Dikes, as if one part of a Stratum had been heaved up, by some Force, acting from beneath; sometimes one Kind of Rock penetrates another Kind; and frequently there are Veins of Iron, Copper, Lead, Silver, and other Ores, found in what appear to have been, Fissures, in the Rocks.

Occasionally Granite or Plutonic Rocks, pass through all the Strata, up-heaving them, on each side; and then appearing above the Surface of the Earth, as if these Rocks had been raised by Subteranean Fires.—But what is most surprising, there appears to have been, at least, three Formations of Plutonic Rocks.—The first Formation is up-heaved, and penetrated, in many Places, by the second; and both the first and second, have been raised, and pierced through by the third Formation.

In SHETLAND, there are two Kinds of Granite, composed of different Materials; the lower Formation penetrating the upper variety, every where, in Veins.—Near Herdelberg, the Granite on the Banks of the River Necker, is seen to consist of three Varieties; differing in Colour, Grain, and various Peculiarities of mineral Composition. One of these, which is evidently the second in Age, is seen to cut through an older Granite; and another, still newer, traverses both the second and first Formations of these ASTONISHING ROCKS.

ORGANIC REMAINS.

ORGANIC REMAINS have not only been found buried deep in the Earth, but the Relics of various Species of Shells, Fishes, Crocodiles, and other large Animals, have been found in different Strata; and these, with other Circumstances, have led Geologists to the Conclusion, that the Depositions did not all take Place at the same PERIOD OF TIME.

SHELLS and other Fossils are found embedded in Mountains, at nearly all Heights, above the Level of the Ocean.—They have been observed at the elevation of 8,000 or 9,000 Feet, in the Alps, and Pyrenees; 13,000 Feet, in the Andes; and above 15,000 Feet, in the Himalayas.

THE FOSSILS found in our Chalk and Limestone Formations, in various Counties of England, are marine Plants, Corals, Sponges, and

numerous Shells. The Remains of Fish are not uncommon; and Specimens of the Crocodile, and of a gigantic Reptile, called the Mososaurus, have also been found in these Formations.

WE HAVE now before us, beautiful impressions of Ferns, Leaves, &c. &c., that were embedded in the Coal-shale; and also several Specimens of Muscle and Cockle Shells, that we obtained from the Clay Iron-stone of Bowling, and Low Moor, near Bradford, Yorkshire.

WE HAVE likewise a few Specimens of Fossil Reeds, and Petrified Trees, as they are generally called; which we found embedded in the Sandstone formation, at Bradford.—One of our Specimens, is Four Inches in diameter; but Mr. Lyell says, "that similar Remains vary from half a Foot, to five Feet in Diameter; and that some of them must have been forty or fifty Feet in Height."—One of these Kind of Petrifications was found, in a horizontal Position, at Bradford, that was nearly Three Feet in Diameter; and about Thirty Feet in Length.

THE ALUM ROCKS, adjoining the German Ocean, in the Vicinity of Whitby, abound with Organic Remains of various Kinds; but particularly with Ammonites, or Snakestones, as they are denominated, in that District.—These Fossils are found, coiled up, in spiral Volutes, inclosed in hard elliptical Stones; and in every Manner resemble, both in Form and Shape, the Reptile from which they are named.

WE HAVE a small Specimen, about an Inch in Diameter; but when we visited the Neighbourhood of Whitby, we saw many dug out of the Alum Rocks, that measured from an Inch, to Six Inches in Diameter.—These Remains were so common, in that District, 40 years ago, that they were considered of little Value; and if we could have foreseen that they would have become so famed in Geology, we might have easily formed a LARGE COLLECTION.

MR. CHAMBERS says, "Ammonites are found over the whole Surface of the Earth; and have received their Name from their Resemblance to the curved Horn, on the Head of the Statue of Jupiter Ammon.—It has been an Animal of wonderful Character and Habits; and its Economy destined it to live, in general, at the Bottoms of deep Seas.—Some of them have been of a Minuteness scarcely visible; and others FOUR FEET IN DIAMETER."

IN THE BRITISH MUSEUM there is a fine and numerous Collection of Single Ammonites, from all Parts of the Globe; and varying in Size, from an Inch, to nearly Three Feet in Diameter.

BUT, the most singular and surprising Specimen, is a Slab or Slate, measuring 34 Inches in Length, and 26 Inches in Breadth; and entirely covered, on one Side, with a Regular Bed of Ammonites, of various Shades of Colour.

Some of them are not more than a Quarter of an Inch in Diameter; but the largest measures Three Inches and a half in Diameter; and many of them are nearly the same Size.

This valuable Specimen was procured from the Neighbourhood of Taunton, in Somersetshire; and contains upwards of 160 Ammonites, on its Surface.—It may be seen in the Mineral Gallery; in which there are also many surprising ORGANIC REMAINS.

REMARKS ON METEORIC STONES.

WHEN OUR YOUNG FRIENDS visit the British Museum, among the Thousands of Curiosities which they will see, we wish to direct their particular Attention to the Fine Collection of *ÆROLITHS*, or *METEORIC STONES*; and which, we think, are the most surprising and astonishing PRODUCTIONS OF NATURE.

These Stones have fallen from the Atmosphere, at various Times, and in different Countries;—some in Germany, some in France, and others in the East Indies, in Russia, in America, in Ireland, in England, &c. &c.

A LARGE STONE, weighing 270 pounds, fell in Germany, Nov. 7th, 1492;—another fell in Italy, in the year 1510, which weighed 120 pounds;—a Stone descended in France, on Nov. 27th, 1627, which was 59 pounds in weight;—in 1695, two large Stones fell in Ireland;—in Jan. 1706, a Stone, weighing 72 pounds, fell in Macedonia;—and two Stones, one of which weighed 200, and the other 300 pounds, descended near Verona, in Italy, in the year 1762; and many others have fallen at different Places, on the Continent.

A LARGE STONE, weighing 56 pounds, was seen to descend from the Clouds, at Wold Cottage, near Hunmanby, in Yorkshire, about Ten Miles to the South of Scarborough, on Dec. 13th, 1795; and a great Portion of which is now deposited in the Mineral Gallery of the British Museum.

On April 5th, 1800, a large Mass of Native Iron, measuring Seventy Cubic Feet, fell in America; and taking the weight of a Cubic Foot of Iron, at 7645 ounces, Avoirdupois, this Mass would weigh 33,447 pounds, equal to 14 Tons 18 Cwt. 2 Qrs. 15 lbs.

The Meteoric Stones which have fallen from the Atmosphere, all appear to have the same Origin, as they perfectly resemble each other; and at the same Time, they are totally different from any terrestrial Substances.—They have been submitted to the most accurate Chemical Analysis; and in all Cases, have yielded the same Substances, and in very nearly the same Proportions.—They contain Silica, Oxyde of Iron, Magnesia, Oxyde of Nickel, Sulphur, and Lime.

VARIOUS HYPOTHESIS have been advanced, to account for these singular and surprising Phenomena.—Some have supposed that they are projected from Volcanoes on the Earth; others that they are formed in the Atmosphere, by Chemical or Electrical Agencies; others that they are projected from Volcanoes in the Moon; and lastly, that they are small Planets, circulating round the Sun or the Earth; and becoming entangled in our Atmosphere, at Length, fall to the Earth, by the Force of GRAVITY.

All these Theories, however, are mere Conjectures; for their REAL ORIGIN is still buried in profound Darkness; and we are left to wonder at the Creative Power of that ALMIGHTY BEING, whose ways are inscrutable and incomprehensible to Man!!!

NOTE.—MR. J. TENNANT, No. 149, Strand, furnishes Cabinets with Collections of Minerals, Shells, and Organic Remains, of the Finest and Rarest Specimens, at different Prices, according to the Sizes of the Boxes.

OBSERVATION.

THE BRITISH MUSEUM contains the Finest, the Best, and the most Valuable Collection of Natural and Artificial Curiosities in the World; and every Person who resides in London or its Vicinity, should take frequent Opportunities of visiting it, and should carefully and minutely examine its Contents.—They will not only be pleased and astonished; but greatly improved in General Knowledge.—The Inhabitants of Bath, Bristol, Exeter, Norwich, Northampton, Birmingham, Sheffield, Manchester, Liverpool, Nottingham, Derby, Huddersfield, Wakefield, Bradford, Halifax, Leeds, York, Driffield, Beverley, Hull, Bridlington, Scarborough, Whitby, Stockton, Durham, Sunderland, Shields, Newcastle-upon-Tyne; and, indeed, the Inhabitants of all other large Towns, should also frequently visit, and likewise support and encourage the different Museums, and other Public Institutions, established in their respective Localities, for the purpose of promoting Useful and General Knowledge.—This would give an Impulse, and a Stimulus to the Young and Rising Generation, that would produce the most HAPPY AND BENEFICIAL EFFECTS TO THE COMMUNITY.

MANY NATURAL CURIOSITIES have been discovered in the Neighbourhood of Whitby, besides Ammonites; and the various Petrifications almost every where found in Alum Rocks, have long excited Wonder, and puzzled Philosophy.—The petrified Shells of Sea-fish are very numerous; and others have been found in the Scars or Cliffs, that cannot be arranged under any Class.—In the early part of the last Century, Dr. Woodward, dug up on the Scarr, the petrified Arm and Hand of a Man, in which all the Bones and Joints were perfectly visible.—In 1743, the Rev. Mr. Borwick found, in the Alum Rock, the complete Skeleton or petrified Bones of a Man; and in the Year 1758, the petrified Bones of a Crocodile, were taken out of the Rock, and sent to the Royal Society. About four Years after, the Skeleton of a petrified Horse, was found in the Alum Works, at Saltwick, at the Depth of 60 Feet under the Ground; and sent to the UNIVERSITY OF ABERDEEN.

DERBYSHIRE, particularly in the Neighbourhoods of Matlock, Buxton, and Castleton, abounds with Natural Curiosities; the Caves, Caverns, and Fissures, being both astonishing and *Awfully Grand*; one Author says, that some of them "Are steep, black, and full of Horror."—At Matlock, there are many surprising Curiosities; and one of the Cliffs or Rocks is one hundred and twenty-eight yards in perpendicular Height.—Bagshaw's Cavern, near Bradwell, is four hundred yards in Length; Eldon Hole, north of Peak Forest Town, is a very deep Chasm, and connected with a vast lateral Cavern below; and Golconda is also a very large Cavern near Hopton.

POOLE'S HOLE, near Buxton, is six hundred and sixty-nine yards in Length; and in some places, it is a very great Height.—In this Cavern, there is a large massy Column of Stalactites, called "*Mary Queen of Scots' Pillar*," on Account of its having been visited by that Princess, during her stay at Buxton.—Before she left that Place, she wrote on a Square of Glass, with a Diamond, the following PROPHECIC LINES:—

"Buxton, whose Fame thy Baths shall ever tell,
Which I, perhaps, shall see no more, farewell!"

PEAK'S HOLE, near Castleton, is also a remarkable Cavern, in which there are several Lakes, formed by Springs of Water; and besides these frightful Caverns, there are numerous Holes in the Rocks, into which Streams of Water fall, and then disappear.

THIS DISTRICT is nearly all of Limestone Formation; and it appears that the Stratum has undergone an amazing Degree of Sinking; and hence the tremendous and frightful Holes and Caverns which we have described; besides, there are many others, in different Parts, amounting, in the whole, to about TWENTY-SEVEN.

WE ARE in Possession of a Variety of the Fossil Shells, and other Organic Remains, from the Limestone Formations of Dudley, and Derbyshire, where immense Rocks, of Millions of Tons Weight, are almost wholly composed of Animal Remains.—Some of these Limestones bear a high Polish; and, at the same time, exhibit to View, beautiful Sections of the Shells of which they are composed.—These **SHELL-MARBLES** are in much Repute, for Chimney-Pieces, and other ornamental Work; and have a singular, but very beautiful Appearance.—Many Persons prefer them, to the finest **ITALIAN MARBLES**.

THE NORTHERN REGION of Derbyshire is evidently Volcanic, not only as appears from the Hot Springs; but also from the general Aspect of the Country, in different Parts; and some persons are of Opinion that the Toadstone, with which this District abounds, is of Volcanic Origin.—In some Parts, the opposite Sides of the Mountain Vales, and also those of the Rocky Glens, correspond so exactly, as almost to make it appear that they had once been united; and, then rent asunder, by **EARTHQUAKES**.

THE SHOCKS of the Great Earthquake which happened in 1755, were distinctly felt in different Parts of Derbyshire; but particularly in the Peak, at Eyam Bridge. Besides the violent Shocks experienced at the Surface of the Earth, some Miners who were at Work in the Lead Mines, in a Drift, 50 yards in Length, and 120 Yards deep, were greatly astonished by Five Heavy Shocks, which they felt in the Course of a few Minutes; but they were still more terrified by the **GRINDING** of the Rocks, against each other; as they expected nothing less, every Moment, than to be entombed in the **BOWELS OF THE EARTH**.

THOSE PARTS OF DERBYSHIRE near the Borders of Cheshire and Staffordshire, are chiefly composed of high, bleak, and barren Rocks.—Indeed, so uneven and rugged is almost all the Road between **Macclesfield** in Cheshire, and **Buxton** in Derbyshire, that the Country People quaintly remark, that it is—

“Up Hill to Buxton all the Way,
And up Hill all Way back.”

ORGANIC REMAINS IN COAL MEASURES.

THE VEGETABLE ORIGIN of Coal, is now generally admitted, by Geologists; and it was undoubtedly derived from Terrestrial Plants, Trees, &c., which were embedded either in freshwater, or marine Shale, Sandstone, &c. &c.

Impressions of Plants, together with entire Trunks of Trees, are frequently found in the accompanying Shale and Sandstone; and also small Branches, with Fruits, occur in some Coal Measures.

Some of these Measures are of fresh-water Origin, and may have been formed in Lakes; others appear to have been deposited in Estuaries, or at the Mouths of Rivers, in Spaces alternately occupied by fresh and salt Water.

MANY DIFFERENT SPECIES of Fishes, Shells, and Plants are found, in some Coal Measures; both near Shrewsbury, and in Coalbrook Dale.—In the Coal Fields, near Edinburgh, Shells are also obtained; and many of those in Yorkshire, abound with marine Shells, Fishes, and Ammonites.

A LARGE FOSSIL TREE, 49 Feet in Length, and lying parallel to the Planes of Stratification, was lately found, in Jarrow Colliery, near Newcastle-upon-Tyne; and in 1829, a Fossil Tree, 72 Feet in Length, was discovered in Gosforth Coal Strata, also a few Miles from Newcastle.

IN THE YEAR 1830, the Trunk of a large Tree, slanting at an Angle of Twenty-seven Degrees, with the Plane of the Stratum, was found in Craighleith Sandstone Quarry, near Edinburgh.—The total Length of this Tree, was upwards of 60 Feet; its Diameter, at the Top, was about Seven Inches; and near the Base, the greater Diameter was Five Feet, and the less Diameter Two Feet; the Tree having been flattened by the Pressure of the incumbent Strata.

WHAT is very singular, although this Tree was found embedded in white quartzite Sandstone, yet the Bark was converted into the finest and purest Coal; but the Interior of the Tree still preserved the woody Texture, in a perfect State; the petrifying Matter with which it was surrounded, being chiefly of a CALCAREOUS NATURE.

THE BEDS which remained, were so even, unaltered, and undisturbed, at the Point of Junction, as clearly to show that they had been tranquilly deposited round the Tree; and that it had not subsequently pierced through them, while they were yet in a soft or LIQUID STATE.

NOTE.—We have not been able to ascertain the Depths of the Coal Mines in which these Fossil Trees were found; but we know that several of the Pits, in the Neighbourhood of Newcastle, are 240, or 250 Yards deep; and about 50 years ago, there was a Pit, at Gateshead, near Newcastle, that was 300 Yards in Depth.

VOLCANOES.

A VOLCANO, or Burning Mountain, is hollow below, and communicating, most probably, with Cavities still deeper than its own; and from whence it is supplied with Fire, and ignited Materials, which it throws up, at uncertain Intervals, through one or more external Spiracles, or Apertures.—A Volcano contains in its Bowels, Sulphur, Metals, and other Materials, which serve as Food, to a subterraneous Fire; and which, in its Effects, is more violent and terrible than Gunpowder, or even than Thunder and Lightning.—Volcanoes constitute, without Doubt, the most striking and formidable Geognostic Phænomenon which Nature has presented to our View; they are not, indeed, so destructive to the Lives of the Human Race, as Earthquakes; but they offer to the Eye, Something much more GRAND AND TERRIFIC.

A Volcano has often been compared to a Cannon of immense Size, and of large Caliber; the Funnel or Mouth of the Crater of a Volcano, being

sometimes more than a Mile in Diameter.—From this tremendous Orifice, are emitted Torrents of Smoke and Flame, and Rivers of Metals, Sulphur, and melted Minerals; the Mixture being known by the Name of LAVA.—Clouds of Cinders, and Thousands of Red Hot Stones, are ejected to an immense Height; and sometimes enormous Rocks, are thrown to the Distance of many Leagues.

The Volcanic Action, during an Eruption, is so great, and the Force of the Explosion so violent; that its Reaction has been known to shake the Earth, agitate the Sea, overthrow Mountains; and raze the most solid Edifices and Towns, even at a very considerable Distance.—The Flame and Smoke of Mount Etna, may sometimes be seen, at the Distance of 160 Leagues; and the Sound of an Explosion, from Mount Vesuvius, has been heard at the Distance of Twelve Miles, like the Roaring of Thunder, and Thousands of Artillery.—Yet our Volcanoes are only like *Artificial Fireworks*, when compared with those of the Andes.—The Sound of one of these Mountains, is not like that of the Volcanoes in Europe, confined to a single Province; but may be heard at the Distance of TWO OR THREE HUNDRED MILES.

A MOST TERRIBLE ERUPTION of the Volcano Tomboro, in the Island of Sumbawa, took place in 1815.—All the Villages near the Mountain were destroyed, with 12,000 of the Inhabitants; and the Fall of the Ashes was so great, that they covered the Houses, at the Distance of Forty Miles.—This Eruption was accompanied by an Earthquake; and the Thunderings of the Volcanic Explosions were so terrible, that they were heard not only in Java, 300 Miles distant; but also in Sumatra, at the Distance of NINE HUNDRED AND SEVENTY MILES!!!

PRODUCTION OF VOLCANOES.

BUFFON, GOLDSMITH and several other Writers on Volcanoes, have asserted that their Heat or Combustion, cannot be supported, without an Accession of Atmospheric Air; but this is a great Mistake, and has lead to very erroneous Conclusions.

Combustion does not at all depend on the presence of atmospheric air, nor even of oxygen gas.

Many instances might be given of combustion, without the presence either of oxygen or air.—A portion of powdered antimony, introduced into a jar of chlorine, will inflame spontaneously, the moment it comes in contact with the gas. The same Phenomenon takes place with Copper, Potassium, Phosphorus, Boron, and many other Substances.

If a few drops of Spirits of Turpentine, on a piece of linen, be brought in contact with chlorine, it inflames instantly.—In all these cases, the absence of air or oxygen may be abundantly proved; and yet the combustion is exceedingly vivid.

We may also here observe, that the division of bodies into combustibles and non-combustibles, abstractedly, is certainly erroneous; their properties, in this respect, depending on the medium to which they are presented.—Thus, bodies which inflame readily in common air or oxygen gas, are incombustible in nitrogen and hydrogen.

If our Atmosphere were composed of hydrogen and nitrogen, instead of oxygen and nitrogen, the class of bodies now called combustible,

would become incombustibles; and oxygen, with many of its combinations, would freely burn.—The truth of this statement may be very easily proved by experiment. A jet of oxygen gas, which will not burn in common air, will burn with ease, in an atmosphere of hydrogen or sulphur.

Another experiment will show that distinction between combustibles and incombustibles, is arbitrarily defined.—If sulphur and copper filings be gently heated together, they suddenly ignite, with the evolution of light and heat; or in other words, combustion ensues. Will any person undertake to say which of these substances is the combustible, or which the supporter of combustion?

From these considerations we are led to infer that in the union of oxygen and hydrogen gases, that the hydrogen as much supports the combustion of the oxygen, as the oxygen does that of the hydrogen; in fact it is simply the union of the two, which produces combustion.—Also, in common fire, the air certainly burns as much in contact with the fuel, as the fuel does in contact with the air.

We may now perceive that it is exceedingly probable, that in the Bowels of the Earth, there exists many substances, capable of exerting on each other the most powerful chemical action, without the presence of atmospheric air.

From the researches of Arago and others, it is almost a matter of certainty, that the interior of the earth, a very little way from the surface, is in a Red Hot State; and we also find there are considerable streams of subterranean waters exist beneath the surface.

Some of our metals at common temperatures, and many of them at a Red Heat, will decompose water with the formation of hydrogen gas.—Now it is very singular that almost all our Volcanoes, are situated a very little distance from the sea, or some body of water.

Knowing, as we do, the immense pressure which water acquires at great depths, it is exceedingly probable that the Fires of Volcanoes, may, in a great measure, be owing to the operation of water, upon the heated materials of the interior of the earth, producing the most intense chemical action; generating gases which are combustible, when they come in contact with air, as they Ascend from the depths of the Abyss; and capable of producing all the TREMENDOUS EFFECTS of VOLCANOES.

EXTRACT FROM BISHOP WATSON'S CHEMICAL ESSAYS.

“MR. LEMERY, as far as I have been able to learn, was the first Person who illustrated, by actual Experiment, the Origin of Subterraneous Fires.—He mixed twenty-five pounds of powdered sulphur, with an equal weight of iron filings; and having kneaded the mixture together, by means of a little water, into the consistence of a paste, he put it into an iron pot, covered it with a cloth, and buried the whole a foot under ground.

“In about eight or nine hours' time the Earth swelled, grew warm, and cracked; hot sulphureous Vapours were perceived, a Flame which dilated the cracks, was observed, the superincumbent Earth was covered with a yellow and black Powder:—in short, a subterraneous Fire, producing a Volcano in Miniature, was spontaneously lighted up, from the reciprocal ACTION OF SULPHUR, IRON, AND WATER.

"That Part of this Experiment which relates to the Production of Fire, by the Fermentation of iron Filings and Sulphur, when made into a Paste, has been frequently repeated, with the same Success, since the Time of Mr. LEMERY."

NOTE.—Bishop Watson says, that he has made the Experiment several Times; and that large Quantities of Materials are not requisite to make the Experiment succeed.—Half a pound of steel filings, half a pound of flour of brimstone, and fourteen ounces of water, well mixed, will form a mass that will acquire heat enough to make it take fire.—He also observes, that Iron and Sulphur would remain mixed together, for ages, without taking Fire, if they were either kept perfectly free from Moisture, or drenched with too much Water.

EFFECTS OF VOLCANOES.

THE ACTION OF VOLCANOES, many of which are now extinct, have caused some of the inequalities of the Earth's Surface; and formed part of our Rocks, Hills, and Mountains.—This appears evident, not only from History; but also from the Aspect presented to us, in almost every Region of the Globe.

Etna, Vesuvius, Stromboli, and Hecla; also Tomboro, in the Island of Sambawa; and Mount Dolomieu, in the Isle of Bourbon, are all still in full Activity; besides many others in different parts of Asia; and also along the Chain of the Andes, nearly from the Straits of Magellan, through Chili, to the north of Mexico, which is a vast District of igneous Action, increasing and upheaving the enormous Mountains.

The Eruption of a Volcano, is one of the most awful and most sublime Phenomenon that is produced by Nature; and the Devastations that are sometimes caused by the Rivers of melted Lava, are most appalling. The ancient Cities of Herculaneum and Pompeii, were both destroyed by an Eruption of Mount Vesuvius, in the year A. D. 79; the former of which was completely buried, in the Lava, to the depth of seventy Feet.—In the year 1669, Catania, a City in Sicily, was much injured by an Eruption of Mount Etna; and in another, attended with an Earthquake, in 1693, it was entirely swallowed up, and 18,000 People were engulfed in the Bowels of the Earth.

In the Island of Teneriffe, there is a Volcano which has long ceased to emit Flames; and, the Island of St. Helena, and many others, bear evident marks of a volcanic origin.—It is well known that at different Times and Places, numerous Volcanoes have made their Appearance in the Sea; and that many Islands have been upheaved from the Bottom of the Ocean, by subterranean Fires.

Towards the Centre and South of France, many Traces of extinct Volcanoes may be recognised; and also, in the North of Spain, the South of Sicily, in Italy, and in Hungary, spent Volcanoes may be seen, with Cones, Craters, and Lava Streams.—There are also Rocks in England, Scotland, and Ireland, and in almost every Country in Europe, which Geologists refer to an igneous Formation.—The Rocks and Caves of Staffa, one of the Islands of the Hebrides; and also the Giant's Causeway, in Ireland, are considered to be of PLUTONIC ORIGIN.

OBSERVATION.—Dr. Macculloch, Mr. Necker, Mr. Lyell, and several other Geologists, have given *New Names* to various Rocks; and, according to the present improved State of Geology, they appear to be better adapted to the Subject, than the *Old Names*, *Primitive Rocks*, *Transition Rocks*, *Floetz Rocks*, &c. &c.—The New Names are Plutonic Rocks, Volcanic Rocks, Aqueous Rocks, Metamorphic Rocks, Underlying Rocks, Overlying Rocks, &c. &c.—Geologists also affirm that Rocks of every Kind and Denomination are continually forming, by the Action of Water, Volcanoes, Igneous Operations, &c. &c.; and that the New Plutonic Rocks frequently upheave the Old Rocks, and all the Overlying Strata.—The Nature, Properties, and Formations of all these Rocks, are minutely described and explained in Lyell's Excellent Work on Geology, to which we particularly refer our READERS.

EARTHQUAKES.

EARTHQUAKES are the most formidable Ministers of Nature; and have tended most powerfully to produce the present Appearance of the Surface of our Planet. They have formed Vallies, and stopped the Courses of Rivers;—made frightful Chasms, and dangerous Precipices;—destroyed and engulfed Towns and Cities;—swallowed up Mountains and Islands;—submersed large and beautiful Tracts of Land, and left in their Stead, putrid Lakes, and unfathomable Abysses.—Nay, it has even been conjectured, that Ireland was severed from England;—England from France;—Europe from Africa;—Sicily from Italy;—Terra del Fuego from South America;—Van Diemen's Land and New Guinea, from New Holland;—Madagascar from Africa;—and Asia from America, by the Tremendous Action of EARTHQUAKES.

PRODUCTION OF EARTHQUAKES.

THE CAUSES WHICH PRODUCE EARTHQUAKES, have not yet been clearly defined; and will, perhaps, for ever remain one of Nature's Secrets, not to be revealed to MAN.—Some Philosophers attribute them to the expansive Power of Vapourized Air, Steam, Gas, &c., engendered in the Bowels of the Earth, by Pyrites and other sulphureous Matters; and these fermenting, by the Filtration of Water, and other Causes, produce inflammation; and thus the Earth is shaken to its very Foundation, by these Awful Visitations, called EARTHQUAKES.

MR. NICHOLSON, in his Introduction to Natural Philosophy, says, "It is extremely probable that Earthquakes owe their Origin to the Discharge between a Cloud and the Earth, in a high Electric State; or even between two Clouds."—Some Philosophers think that the Powers of the Electric Fluid, in the Bowels of the Earth; or the Galvanic Modification of Electricity, may produce EARTHQUAKES.—(See Gregory's *Lessons*, page 261.)

MR. WILLIAM STURGEON, has an excellent Article on Electro-pulsation, and Electro-momentum, in his *Annals of Electricity*, Vol. I. Page 40.—At the close of this Article, Mr. S. says, "These then are some of the effects of Electric Currents, or of the momentum of the electric fluid, in a state of motion, after the exciting cause is entirely cut off.—The shock thus produced, may very conveniently be compared to the blow given by Montgolfier's Hydraulic Ram.—Electro-momenta may be pro-

duced by any mode of excitation whatever, and the effects will be proportional to the velocity and quantity of the electric fluid first put in motion ; and the length of the original channel is also to be taken into Account.—If then Electro-momenta, capable of producing violent shocks, and vivid sparks, can be produced by a few hundreds of feet of thin copper wire ; what is it that might not be expected from the electro-momenta of Nature, arising from currents of many Miles in extent, kept in motion either by heat, saline solutions, or by other causes, amongst the metalline Strata, below the surface of the Earth? A sudden disruption in the circuit would insure the blow ; and the Result might be an **EARTHQUAKE**."

By WHATEVER AGENTS Earthquakes are produced, we may safely infer that the Natural Causes of their Production, are inherent in the Earth ; and it certainly does appear that many of them are in some Manner connected with Volcanoes ; as they often take Place, during Volcanic Eruptions.—Sometimes the Shock of an Earthquake, precedes the Eruption of a Volcano ; and this was the case in 1794, when two Shocks were experienced at Naples, and the surrounding Country, a little before the Violent Eruption of Mount Vesuvius.—Besides, it is well known, that many Volcanic Islands have made their Appearance in the Sea, during the Action of Earthquakes ; both in ancient and modern Times.—Pliny and Justin have recorded several ; and Professor Pallas mentions one Island that rose, in 1790, in the Sea of Asoph ; and since that Time, some others have appeared, in different Seas and Oceans, during the **CONVULSIONS OF EARTHQUAKES**.

EFFECTS OF EARTHQUAKES.

PLINY, THE GREAT NATURALIST, was suffocated by the sulphureous exhalations arising from an Eruption of Vesuvius, in the Year 79, of the Christian Era.—He has recorded an Earthquake which destroyed, in one Night, Twelve Cities, in Asia Minor ; and during the Reign of the Roman Emperor, Trajan, who died about the Year 117, the City of Antioch, and a great part of the adjacent Country, were buried by an Earthquake.—About three Hundred Years after, in the time of Justinian, it was again destroyed, with forty Thousand of the Inhabitants ; and in 1182, most of the Cities in Syria, were overwhelmed in the same Manner.

In the Year 1638, a violent Earthquake happened at Calabria, in Italy, by which the City of Euphæmia was entirely swallowed up ; and nothing but a dismal and putrid Lake appeared in the Place where it stood. "Such," says Father Kircher, "was the fate of the City of Euphæmia ; and as we continued our melancholy Course along the Shore, the whole Coast, for the Space of two hundred Miles, presented nothing but the remains of Cities, and Men scattered over the Fields, without a Habitation."

The Earthquake which happened in Jamaica, in the Year 1692, was very terrible in its Effects. In two minutes, it destroyed the Town of Port Royal ; and sunk the Houses in a Gulf, Forty Fathoms Deep.—Most of the Rivers were stopped up by the falling of the Mountains ; and it was a considerable Time, before they made themselves New Channels.—The Hills and Mountains seemed particularly affected by the

violence of the Shocks ; and it was supposed that the principal Seat of the Concussions, was in the elevated Parts of the Island.

In the Year 1693, a most terrible Earthquake took place, which did great Damage in Sicily ; and, as before mentioned, destroyed the City of Catania. The Shocks of this Earthquake were felt in Germany, France, and England ; and its motion extended to a Circumference of Two Thousand Six Hundred Leagues. It chiefly affected the Sea Coasts, and great Rivers ; and was more perceptible upon the Mountains than in the Valleys.—Although the Shocks of this Earthquake did not continue above three Minutes ; yet nearly nineteen Thousand of the Inhabitants of Sicily, perished by this Catastrophe.

The Great, and almost Universal Earthquake, which happened on the First of November, 1755, affords a dreadful Example of the chief Attendants of these striking and awful Phenomena.—Its Effects appear to have been most severely felt in Spain and Portugal ; and the City of Lisbon, the Capital of the latter Country, was almost entirely destroyed, with about Sixty Thousand of its Inhabitants ; although the Shocks did not continue longer than about Six MINUTES.

The Shocks of this Earthquake, and the Effects that it produced upon Seas, Rivers, Lakes, Canals, and even on Wells and Springs, were experienced at an immense Distance from the Principal Seat of its Action.—They were felt in Africa ; and extended to Holland, France, Germany, Norway, and Sweden ; and the Agitation of the Waters were perceived in various Parts of England, Wales, Scotland, and Ireland.—Such were the Phenomena of this very Remarkable and Destructive Earthquake, which extended over a Tract of the Earth, comprising, at least, FOUR MILLIONS OF SQUARE MILES.

OBSERVATION.

THE EFFECTS produced by Physical Causes, and by the various Operations of Nature, affect us in very different Ways ; and are productive of very different Sensations.—We feel pleasure in viewing the meandering Brook, the gentle River, and the picturesque Lake ; we are delighted with the fertile Plain, the rising Eminence, and the romantic Valley ; we are astonished with the snow-capt Mountain, the dangerous Precipice, and the unfathomable Fissure ; our Senses are confused and overpowered, with the Noise and Commotions produced by the mighty and overwhelming Cataract ; Floods, caused by the Overflows of Rivers, and extraordinary High Tides, frequently commit great Devastation, by inundating Towns, Cities, and fine Tracts of Land ; Hurricanes, Tornados, and Water-spouts, often produce fearful Desolation ; the forked Lightning's vivid Flash, is awfully grand, and sometimes dreadfully fatal ; the pealing and rolling Thunder, shakes the very Foundations of the Earth, and reminds us of the Artillery of Heaven ; Volcanoes are frightful in their Effects, and destructive in their Consequences ; but the most tremendous and the most terrible Visitations of the ALMIGHTY, are Earthquakes ; by which Towns, Cities, Mountains, and Islands, with their Inhabitants, are swallowed up in a Moment, and buried in the BOWELS OF THE EARTH.

By the Deep Ear of Meditation heard,
 Still in the midnight Witches sing of Him.
 He robs a Cloud the Tempests blow His Wrath;
 The Thunder is His Voice; and the red Flash
 His speedy Sword of Justice. At His Touch,
 The Mountains flame. He shakes the solid Earth,
 And rocks the Nations. Nor in these alone,
 In every common instance, GOD is SEEN."

THOMSON.

HAVING MADE A FEW Observations and Remarks, on different Branches of Geology, we may now notice the Grand Geological Query, which has puzzled Philosophers in All Ages.—Of what Kind of Matter, or Materials is the Internal Part of the Earth composed; and what is its State and Condition beyond the greatest Depths to which MAN EVER PENETRATED?

THE GREATEST DEPTH to which Man ever penetrated into the Interior of the Earth, being not more than A FEW HUNDRED YARDS, bears a very small Proportion to the Earth's Semidiameter, which in round Numbers, we may call 4000 Miles; consequently, there is an unknown and an unfathomable Region beneath our Feet, that must ever remain unexplored, and unexamined by the HUMAN RACE.

As we descend into the Interior of the Earth, we find its Shell or Crust to be composed of different Materials; and each Kind generally growing more dense, as the Depth increases. These Substances are commonly deposited in Beds or Layers of various thicknesses; and consist of Sand, Gravel, Clay, Slate, and Stone; Gravel and Marl, mixed with Shells; Various Beds, with different Kinds of Coal, &c. &c.; but they do not always occur in the same Order, in every Part of the Globe.

Philosophers are generally of Opinion that the Central Parts of the Earth, are much denser and heavier than any thing upon its Surface; and some even suppose that the Matter filling the interior, is at least five or six Times heavier than any Metal with which we are acquainted.—However, whatever may be the Nature and Weight of this Matter, there is every Reason to believe that it is in a continued STATE OF FUSION.

Miners have long since discovered that it is much warmer at the Bottom of Coal Mines, than on the Surface of the Earth; and it has lately been proved by M. Arago, and several other Philosophers, that when the Centigrade Thermometer stood at 11 degrees 87 minutes, in the Atmospheric Air; it rose to 18 degrees 12 minutes, when let down 369 Feet into one of the Artesian Wells, near Rochelle, in France.—These Measures of the Centigrade Thermometer, being reduced, we obtain 53 degrees 22 minutes, and 64 degrees 37 minutes, of Fahrenheit's Thermometer; and this shows an Increased Temperature of 11 degrees 15 minutes, at the Depth of only 123 Yards.—In more recent Experiments, made by M. Arago, in the Artesian Well or Boring, at Grenelle, near Paris, 1,584 Feet Deep; he found an Increase of Temperature, of about *One Degree* for every 69 Feet; or 23 Degrees, at the Depth of 528 Yards.

We must also notice our own Hot Springs at Buxton, Matlock, Bath, Huddersfield, and several other Places in England; and very many on the

Continent, particularly at Carlsbad, in Bohemia, nearly in the very Centre of Germany, where the Temperature of the Hot Springs, is 165 Degrees of Fahrenheit; being only 47 Degrees below the Boiling Point.

Every Traveller who has visited Iceland, is acquainted with the Geysers, or Hot Spouting Springs of that Island.—The most important of these, is the "Great Geyser," not far distant from Mount Hecla. This Terrible Fountain sends forth Volumes of Steam; and ejects Columns of Boiling Water, from Nine to Twelve Feet in Diameter, and from Seventy to Two Hundred Feet in Height.—Besides this Great Caldron, there are many other Boiling Fountains in Iceland; and it has been calculated, that during Eruptions, some of them throw up nearly 60,000 Gallons of Boiling Water every Minute.

THEN, we must not forget to mention the Rivers of Melted Lava, that are poured from nearly Two Hundred Volcanoes; and which, of course, must have a tendency to make hollow, many Parts of the Shell of this Terrestrial Globe.—Now, taking all these Circumstances into Consideration, we may fairly draw the Conclusion, that we tread upon a Crust of the Earth, beneath which, at no great Distance from the Surface, are SEAS OF BOILING WATERS, AND OCEANS OF MELTED METALS !!!

EXTRACT FROM MUDIE'S EARTH.

"GEOLOGY, which means '*The Voice of the Earth*,'—that is the account which taken as a whole, it is capable of rendering up to human investigation; in its present state, its past history; and, as far as experience warrants the conjecture, its condition in future times. This, though it is one of the subjects to which the attention of mankind has been drawn, ever since they had so far advanced in improvement, as to be capable of speculating about the causes of things; yet the materials of our knowledge of this Science lie deep in the Earth, and the events of which it affords the evidence, lie in times so remote, that it is very difficult to connect them with the present times, or even with any times of which we have a Human Record.—There is, however, a degree of grandeur in this Science, which renders it peculiarly attractive; and this grandeur comes more closely home to us than that of the HEAVENLY BODIES.

"In the deepest mine, under the summit of the loftiest mountain, which has been trod by human foot, there are traces of the universality of that wonderful working, to which allusion has been made; and which, throughout the whole globe, and in every portion of it which we can by possibility examine, proclaims, in language not to be mistaken, that it is a *production*; and that, diversified as are its parts, and eventful as has been its history, it is the result of one Creative FIAT, and obedient to one law; that all its changes, however mighty, or however minute, and all its productions, however varied, are linked together in a most mysterious manner;—a manner which leads the mind irresistably to the belief of a *Creative Power and a Ruling Providence*."

EXTRACT FROM LYELL'S GEOLOGY.

"OF WHAT MATERIALS is the Earth composed, and in what Manner are these Materials arranged?—These are the Inquiries with which the Science of Geology is occupied.—Such Investigations appear, at first sight, to relate exclusively to the Mineral Kingdom, and to the various Rocks, Soils, and Metals, which occur upon the Surface of the Earth; or at various depths beneath it.—But, in pursuing these Researches, we soon find ourselves led on to consider the successive Changes which have taken Place in the former state of the Earth's Surface and Interior, and the causes which have given rise to these Changes; and, what is still more singular and unexpected, we soon become engaged in researches into the History of the Animate Creation, or of the various tribes of Animals and Plants which have, at different periods of the past, inhabited the *Globe*."

"ALL ARE AWARE that the solid parts of the Earth consist of distinct substances, such as clay, chalk, sand, limestone, coal, slate granite, and the like; but previously to observation, it is commonly, imagined that all these had remained from the first, in the state in which we now see them,—that they were created in their present form, and in their present position.—*Geologists* have come to a different conclusion.—They have discovered proofs that the external parts of the earth, were not all produced in the beginning of things; or in the state in which we now behold them; nor in an instant of Time.—On the contrary, they have acquired their actual configuration and condition gradually, under a great variety of circumstances; and at successive periods, during each of which, distinct races of living beings have flourished on the land, and in the waters; the remains of these Creatures still lying buried in the *Crust of the Earth*."

EXTRACT FROM CHAMBERS'S GEOLOGY.

"WHEN WE ARRIVE at the Muschelkalk, or Shell Limestone, we find a great difference, leading to a supposition that, at this Era of Geological Chronology, circumstances had arisen, changing the character of marine life, over certain portions of Europe; that certain animals abounding previously, and for a great length of time, disappeared never to reappear, at least as far as we can judge from our knowledge of organic remains; and that certain New Forms of a very remarkable kind were added.

"The New Creatures were of such a class as we might expect to be the first added to the few specimens of fish which had hitherto existed: they were of the class of Reptiles,—creatures whose organisation places them next in the scale of creation to fish; but yet below the higher class of animals which bring forth their young alive, and nourish them by suck (mammalia.) The Earth was, as yet, only fit to be a partial habitation to creatures breathing its atmosphere, and living upon its productions.—It is supposed to have been under so high a temperature, as to be unsuitable for mammalia:—the lands which existed were probably low and marshy, with a hot, moist atmosphere; so as to present an appropriate field of existence, only for Lizards, Crocodiles, and creatures of similar character.—It is also to be supposed that the land was, at this

period, undergoing frequent changes and convulsions; so that only a class of creatures to which submersions and deluges were matter of indifference, could reside upon it, without a greater waste of life than was part of the Great General Design."

"The Reptiles, which first begin to appear in the Muschelkalk, continued to flourish while a great succession of other rocks was forming:—Throughout the whole of the Secondary Formation, there were few other land animals.—In fact, the world must have been in the possession of Reptiles, for a many thousand times longer period than it appears to have yet been in the possession of *Man*.

"When we see," says Dr. Buckland, in his *Bridgewater Treatise*, 'That so large and important a Range has been assigned to Reptiles, among the former Population of our Planet, we cannot but regard with Feelings of new and unusual Interest, the comparatively diminutive existing Orders of that most ancient family of Quadrupeds, with the very Name of which we usually associate a Sentiment of Disgust.—We shall view them with less Contempt, when we learn from the Records of Geological History, that there was a Time when Reptiles not only constituted the chief Tenants, and most powerful Possessors of the Earth; but extended their Dominion over the Waters of the Seas; and that the Annals of their History may be traced back, through Thousands of Years antecedent to that latest Point, in the progressive Stages of Animal Creation, when the *First Parents of the Human Race were called into Existence*.'"

EXTRACT FROM HIGGINS'S GEOLOGY.

"THE CRUST OF THE EARTH, as we have already stated, consists of a number of beds of various substances, irregularly alternating with each other.—It has been proved by analogy, that those beds were formed by causes still in action, in a manner similar to those that are now being deposited in the beds of Seas, Rivers, and Lakes; and that the Formation of each Stratum, required a considerable portion of Time.—But if a length of time be required to form a single deposit; how much more time will be necessary to form a Series, each rock differing from those with which it is connected, in Mineralogical Characters?

"Circumstances which will produce a calcareous deposit, will not produce an argillaceous.—An entire revolution of local circumstances is absolutely necessary, in order to change the character of the Bed.—Admitting, therefore, that the Strata composing the Crust of our Globe, were formed with a rapidity of which we have no conception, from a variety of circumstances, particularly the greater surface temperature of our Earth; it is quite apparent that a considerable time must have been occupied, in their deposition.

"But all these beds are crowded with Organic Remains, which, like the Relics of Art, point out the character and circumstances of the Age, in which they were produced.—In certain beds we find remains which cannot elsewhere be found, in the whole series; but *seem* only to have existed at that particular Time, when those beds were forming.—Certain other beds contain, in great abundance, the remains of ovipa-

reus Animals; but neither above nor below them, can any individual specimen be found.—And there are other strata, and these among the highest in the series, which contain the bones of Mammalia; but below the same fossils have been sought for in vain.

“Every step, therefore, which we take in the Investigation, impresses us the more deeply with the conviction, that Time must have long shaken its hasty Wing over this Terrestrial Globe, and that the Earth often completed its accustomed journey round the Great Orb of Day, after its Creation; before the *Eternal God* of all, placed *Man* upon it, as the *Perfection* of his *Work*, and the *Object* of his *Love*.”

EXTRACT FROM PROFESSOR PLAYFAIR'S HUTTONIAN THEORY.

“AMID all the Revolutions of the Globe, the Economy of Nature has been uniform; and her Laws are the only Things that have resisted the General Movements.—The Rivers and the Rocks, the Seas and the Continents, have been changed in all their Parts; but the Laws which direct those Changes, and the Rules to which they are subject, have remained INVARIABLY THE SAME.

REMARKS.

THE CORRESPONDENCE between the Mosaic Account of the Creation, and the Discoveries of Modern Geologists, is beautifully explained; and every Objection that has been brought against Geology, as not agreeing with the Scriptures, is fully answered, in Dr. Buckland's *Bridgewater Treatise*, Chapter the Second, entitled, “The Consistency of Geological Discoveries with Sacred History.”—Dr. Buckland also refers his Readers to Bishop Bird Sumner's “RECORDS OF THE CREATION.”

“BELOVED, be not Ignorant of this ONE THING, that ONE DAY is with the LORD, as a THOUSAND YEARS: and a THOUSAND YEARS, as ONE DAY,”—(*Second Peter, Chapter the Third, Verse the Eighth.*)

WORKS ON GEOLOGY.

CUVIER'S THEORY OF THE EARTH;—Lyell's *Elements of Geology*, and his *Principles of Geology*;—Phillip's *Guide to Geology*, and his *Treatise on Geology*;—Brande's *Outlines of Geology*;—Francis's *Lectures on Geology*;—Dr. Ure's *System of Geology*;—Mantell's *Wonders of Geology*, and his *Geology of the South-East Parts of England*;—Bakewell's *Introduction to Geology*;—Greenough's *Principles of Geology*;—Higgins's *Alphabet of Geology*;—Chamber's *Geology*;—Sutcliffe's *Introduction to Geology*;—Penn's *Mosaic Geology*;—Higgins's *Mosaic and Mineral Geology*;—Fairholme's *Scripture Geology*;—Parkinson's *Organic Remains of a former World*;—*Conversations on Geology*, by Mrs. Marcet;—*Geological Sketches*, by Maria Hack;—and DR. BUCKLAND'S *BRIDGEWATER TREATISE*.

MINERALOGY.

MINERALOGY treats particularly of the Nature and Properties of all Kinds of Precious Stones, as Diamonds, Rubies, Emeralds, Topazes, Sapphires, Garnets, Amethysts, Beryls, Agates, Jaspers, Cornelians, Hyacinths, Crystals, &c. &c.; of Metallic Ores, Metals, and Minerals, as Platinum, Gold, Silver, Lead, Zinc, Iron, Copper, Tin, &c. &c.; of the different Varieties of Marbles, Stones, Slates, Coals, Chalks, Clays, Earths, &c. &c.; and of the various Shapes and Figures which Fluid Substances assume, when they undergo Crystallization.

This Science is of great value, in the Practical Affairs of Life; as it includes the various Methods of Smelting, Purifying, and Assaying all kinds of ORES, and METALS.

NOTE.—GEOLOGY and MINERALOGY are so closely connected, that they may be justly styled SISTER SCIENCES.

OBSERVATION.

GEOLOGISTS have certainly done a GREAT DEAL towards proving in what Manner the various Rocks, and the different Strata of the Globe have been formed, at various Periods of Time; and they have also brought to Light the hidden Wonders of the Earth, by laying open its Bosom, and producing the Organic Remains of Plants, Trees, Shells, Fishes, Reptiles, and Animals of enormous Size, which inhabited this Planet, in Ages that are FAR GONE BY.—But there still remains very much for them to accomplish; for they have not yet informed us how, or in what Manner the different Ores of Gold, Silver, Lead, Copper, Zinc, Tin, Iron, and various other Metals and Minerals were formed.—Neither have they brought to Light, the Origin of the Precious Stones, such as Diamonds, Rubies, Emeralds, Topazes, Sapphires, Garnets, &c. &c.—It is generally admitted, that they were not created, in their present State, by the ALMIGHTY FIAT;—how then, and in what Manner were they formed?—Was it by *Accident* or *Chance*?—or was it by the Laws of Nature, impressed upon Matter, by the OMNIPOTENT CREATOR?

WORKS ON MINERALOGY.

KIRWAN'S ELEMENTS OF MINERALOGY;—Jameson's Mineralogy;—Accum's Analytical Mineralogy, and his Crystallography;—Phillips's Introduction to Mineralogy;—Kidd's Outlines of Mineralogy;—Aikin's Manual of Mineralogy;—Bakewell's Introduction to Mineralogy;—Allam's Manual of Mineralogy;—Joyce's Chemical Mineralogy;—Minerals and Metals, their Uses;—Buckland's Geology and Mineralogy;—Cleaveland's Mineralogy and Geology;—Phillips's Outlines of Mineralogy and Geology;—Aikin's Synopsis of the Mineral Kingdom;—Thomson's Outlines of Mineralogy and Geology;—and Williams's TREASURES OF THE EARTH.

OBSERVATIONS ON SCRIPTURE GEOLOGY
AND MINERALOGY.

1.—GEOLOGY has generally been considered as a NEW SCIENCE; but it is certainly nearly as Old as the WORLD ITSELF.—In the Fourth Chapter of Genesis, and the Twenty-second Verse, we find that “Tubal-Cain was an Instructor of every Artificer, in Brass and Iron.”—Now, it follows, that the Ores must first have been dug out of the Earth; and then smelted and purified, in Order to make the Metals malleable, and useful for Tools, and other necessary Instruments.—And, as Brass is a compound Metal, consisting of Copper and Zinc, (or its Ore, Calimine;) it is evident that Tubal-Cain must have discovered the Method of compounding these Metals, in Order to produce BRASS.

2.—GEOLOGY AND MINERALOGY form a considerable Portion of the Twenty-eighth Chapter of the Book of JOB.—There we are told, that there “Is a Vein for the Silver, and a Place for Gold;” and that “Iron is taken out of the Earth, and Brass is molten out of the Stone.”—“As for the Earth, out of it cometh Bread; and under it, is turned up as it were FIRE.”—The last Expression evidently refers to the Dangers that MINERS have to encounter, from FIRE DAMPS, which are caused by the Ignition of CARBURETTED HYDROGEN GAS, the Explosions of which have produced so many dreadful Accidents in our COAL MINES.—Or, perhaps, JOB may allude to Volcanoes, of which there have always been numbers in the EAST.—We have Accounts of Eruptions that took Place, at least Twelve Hundred Years, before the Commencement of the CHRISTIAN ERA.

3.—THE PATRIARCH JOB, appears to have been well acquainted with the Nature and Properties of Minerals, for he does not tell us that there are Veins of Gold, as he does of Silver; for Gold is never found in Veins, but in the form of Dust, or Grains, as they are generally called; although some of the Pieces or Masses of Gold, frequently weigh many Ounces.—In the sixth Verse, Job says, “The Stones of the Earth are the Place of Sapphires; and it hath Dust of Gold;” and in some of the following Verses, he mentions many of the Precious Stones that are found in Mines, Rocks, and Mountains.

4.—JOB also speaks of the working of Mines, in Order to obtain the precious Stones; and likewise of the making of Canals or Artificial Rivers, by the Labour and Perseverance of Man; either for the Transportation of Goods, or for clearing away the Rubbish from the Mines.—He also mentions the stopping or turning the Floods, or Waters at the Surface of the Earth, no doubt by Drains and Aqueducts; and most probably he refers to draining the Mines of subterranean Waters, that frequently break in upon the Miners, in great Quantities; and which must be carried off, either by Drifts, Drains, Machines, or other Contrivances, before Man can bring to Light the hidden TREASURES OF THE EARTH.

5.—In the Ninth Verse, and in the two following Verses, Job describes these operations in the following beautiful and poetic Manner:—“He putteth forth his Hand upon the Rock; he overturneth the Mountains by the Roots.”—“He cutteth out Rivers among the Rocks; and his EYES SEE every precious Thing.”—“He bindeth the Floods from overflowing; and the Thing that is hid, bringeth he forth to Light.”

6.—The subject of this Chapter is an Inquiry after Knowledge and Wisdom, IN GENERAL; such as it is proper for Man to know; and Job sets forth its Value in a most beautiful Manner, by stating that it cannot be purchased with Silver or Gold, or with all the Jewels and precious Stones that are found in the Earth.

7.—In the Twelfth Verse, and in the following Verses, Job thus emphatically expresses himself:—"But where shall Wisdom be found?—and where is the Place of Understanding?"—"Man knoweth not the Price thereof."—"It cannot be gotten for Gold; neither shall Silver be weighed for the Price thereof."—"It cannot be valued with the Gold of Ophir, with the precious Onyx, or the Sapphire."—"The Gold and the Crystal cannot equal it; and the Exchange of it shall not be for Jewels or Vessels of fine Gold."—"No mention shall be made of Coral, or of Pearls; for the Price of Wisdom is above Rubies."—"The Topaz of Ethiopia shall not equal it; neither shall it be valued with PURE GOLD."

8.—After Job has thus set forth the inestimable Value of Wisdom; he then, in the Twentieth Verse, repeats nearly the same Question that he asks in the Twelfth; and afterwards gives the answer, by affirming that Wisdom dwelleth with the Almighty Creator and Maker of the Universe.—"Whence then cometh Wisdom?—and where is the Place of Understanding?"—"God understandeth the Way thereof."—"For he looketh to the Ends of the Earth, and seeth under the whole Heaven;"—"To make the Weight for the Winds; and he weigheth the Waters by Measure."—"When he made a Decree for the Rain, and a Way for the Lightning of the Thunder;"—"Then did he see it; and declare and number it; he prepared it; yea, he searched it out."—"And unto Man he said, Behold, the Fear of the Lord, that is Wisdom; and to depart from Evil, is UNDERSTANDING."

9.—YES, THE FEAR OF THAT GOD "who laid the Foundations of the Earth, and who stretched out the Heavens like a Curtain; who gathereth the Waters of the Sea together, and who sitteth upon the Floods; who maketh the Clouds his Chariot, and walketh upon the Wings of the Wind; who setteth fast the Mountains, and stilleth the Noise of the Waves; whose way is in the Sea, and whose Path is in the great Waters; who hath measured the Oceans in the Hollow of his Hand, meted out Heaven with a Span, and comprehended the Dust of the Earth in a Measure; and who weigheth the Mountains in Scales, and the HILLS IN A BALANCE."

EXTRACTS FROM THE REV. JOHN WESLEY'S HYMNS.

"THE GOD that rules on high,
That all the Earth surveys,
That rides upon the stormy sky,
And calms the roaring seas."

"WISDOM DIVINE! Who tells the price
Of Wisdom's costly merchandise?
Wisdom to silver we prefer,
And gold is dross compared to her."

" Her hands are fill'd with length of days,
True riches, and immortal praise ;
Riches of Christ on all bestow'd,
And honour that descends from God."

" To purest joys she all Invites,
Chaste, holy, spiritual delights ;
Her ways are ways of pleasantness,
And all her flowery paths are peace."

" Happy the Man who Wisdom gains ;
Thrice happy, who his guest retains ;
He owns, and shall for ever own,
Wisdom, and Christ, and Heaven are ONE."

A HYMN ON PROVIDENCE,—BY ADDISON.

THE LORD my pasture shall prepare,
And feed me with a shepherd's care ;
His presence shall my wants supply,
And guard me with a watchful eye ;
My noon-day walks he shall attend,
And all my midnight hours defend.

When in the sultry gleebe I faint,
Or on the thirsty mountain pant,
To fertile vales and dewy meads
My weary wand'ring steps he leads,
Where peaceful rivers, soft and slow,
Amid the verdant landscape flow.

Though in a bare and rugged way,
Through devious lonely wilds I stray,
Thy bounty shall my pains beguile:
The barren wilderness shall smile,
With sudden greens and herbage crown'd,
And streams shall murmur all around.

Though in the paths of death I tread,
With gloomy horrors overspread,
My steadfast heart shall fear no ill,
For thou, O Lord, art with me still ;
Thy friendly crook shall give me aid,
AND GUIDE ME through the DARKSOME SHADE.

NOTES.

1.—TRANSLATORS are not entirely agreed about the Names & Qualities of some of the precious Stones, mentioned in different Parts of the Holy Scriptures ; however, we can have no doubt, that those nam by Job, were considered the most valuable that were known in Time.

2.—GOLD is found native in Peru, in Brazil, Siberia, North Carolina, Hungary, and in several other Parts of the World. It generally occurs in a metallic State, alloyed with a little Silver, or Copper; and most commonly in the Form of Grains.—It abounds in the Sands of many African Rivers; in South America, and in India.—Several of the Rivers of France contain Gold in their Sands; and it has also been discovered in Sweden, Norway, Scotland, and Ireland.—The native Gold found in Ireland, was in Grains, from the smallest Size, up to one, two, or three Ounces. Only two Grains were found of a greater weight; one of which was five, and the other twenty-two Ounces.—In Mexico, and Siberia, Grains have been found weighing fifteen or sixteen Pounds.—When a projecting Part of one of the highest Mountains in Paraguay, fell down, about thirty Years ago; Pieces of Gold were found in it, weighing from Two to FIFTY POUNDS.

3.—COMMENTATORS have not clearly determined which of the Precious Stones, mentioned in the Scriptures, was the Diamond; but there can be no doubt that it was known, under some Name, long before the Time of either Job or Moses.—It is the hardest of all Bodies, and the most valuable of Gems; and was long known, among the Eastern Nations, by the name of Adamant.—The general Colour of the Diamond, is that of *pure, clear Water*; but Varieties are to be found, showing the following Colours:—grey, brown, red, yellow, green, blue, and black.—The two latter, are very rare; and, therefore, considered of high Value.—G. H. Caunter, informs us, that he once saw a Diamond, of a beautiful blue Colour; and which weighed only thirteen Carats, valued at twelve hundred Guineas.—The weight of a Carat is FOUR GRAINS.

4.—DIAMONDS are principally found in the western Peninsula of India, on the coast of Coromandel, in the kingdoms of Golconda and Visapour, in the Island of Borneo, and in the Brazils.—They are generally found embedded in a yellowish Ochre, or dispersed among rocks of grit stone, or quartz; and sometimes in the Channels of Rivers, having been carried from their native Beds, by the MOUNTAIN TORRENTS.

5.—DIAMONDS vary in value, according to their size; the largest being accounted the best.—A large Diamond weighing 215 Carats, is in the Possession of the Sovereign of Portugal.—One weighing 193 Carats, was purchased by the Empress Catharine of Russia, for £90,000 ready money; and an annual Pension of £600, to the Vendor. This Diamond is about the Size of a Pigeon's Egg.—But the largest Diamond yet known, is said to be in the Possession of the Great Mogul, and weighs 279 Carats; and is valued at the enormous Sum of £540,000 STERLING.

6.—MR. BINGLEY says, "The largest Diamond ever known (if it be such, and not a white Topaz, as some persons have supposed,) is in the possession of the Queen of Portugal; and weighs 1,680 Carats, or more than eleven Ounces.—It was found in Brazil; and sent to Lisbon in the year 1746.—It is still uncut; and has been valued at £5,644,800 STERLING."

7.—NEXT in Value to the Diamond, is the Ruby, then the Emerald and Sapphire. The Amethyst, Topaz, and Beryl, are considered of nearly equal Value; and the Garnet is the cheapest of all PRECIOUS STONES.

7.—ACCORDING to our English Translation of the Bible, the High Priest's Breastplate contained Twelve Precious Stones; the Diamond occupying the Sixth Place, and on it was engraven the Name of NAPHTHALI.

(Exodus, Chapter 28th, and Verse 18th;—see also Ezekiel, Chapter 28th, and Verse 13th.)

OBSERVATIONS ON THE POWER AND THE WISDOM OF GOD, AS DISPLAYED IN THE WORKS OF THE CREATION.

THE POWER, the Goodness, and the Wisdom of God, are mentioned with Awe, Wonder, and Reverence, in many Places of the Holy Scriptures; we shall make a few Extracts, and refer our Young Readers to other Places and Passages, which they may peruse at their Leisure, with great Pleasure, Profit, and Advantage, as expatiating on the WONDERFUL WORKS OF THE CREATION.

PSALM 8th, Verses 3rd, and 4th,—“When I consider thy heavens, the work of thy fingers, the moon and the stars which thou hast ordained; what is man, that thou art mindful of him?—and the son of man that thou visitest him”?

THERE are many fine Passages in the 18th, 19th, 29th, and the 33rd. Psalms; also, the 50th, 65th, 66th, and 77th, Psalms, are beautifully sublime.

We may likewise refer to the following Psalms, as setting forth, in a highly characteristic Manner, the Power and the Goodness of God; namely, the 90th, 97th, 104th, 113th, 114th, 139th, 147th, and 148th. Psalms; several of which are HIGHLY DEVOTIONAL.

MICAH, Chapter the 1st, and the 3rd, and 4th, Verses;—“For behold the Lord cometh forth out of his place, and will come down, and tread upon the high places of the Earth; and the mountains, shall be *molten* under him; and the Valleys shall be cleft as wax before the fire; and as the waters that are poured down a steep place.”

NAHUM, Chapter the 1st, from the 3rd, to the 6th, Verse;—“The Lord is slow to anger, and great in power; and will not at all acquit the wicked.—The Lord hath his way in the whirlwind, and in the storm; and the clouds are the dust of his feet.—He rebuketh the sea, and maketh it dry; and dryeth up the rivers.—The mountains quake at him, and the hills *melt*; and the earth is *burned* up at his presence.—Who can stand before his indignation?—and who can abide in the fierceness of his anger?—His fury is poured out like fire; and the rocks are thrown down by HIM.

THE WHOLE BOOK OF JOB is highly Poetic and sublime; and contains beautiful descriptions of the Power and other

Attributes of GOD.—POPE says, "With regard both to sublimity of thought and morality, the Book of Job, exceeds beyond all comparison, the most noble PARTS OF HOMER."

WE would advise our Young Friends frequently to read the whole Book; but we shall, at the same time, call their particular attention to a few of the most descriptive and sublime Chapters, in which the Power of God, is set forth in most beautiful and ENERGETIC LANGUAGE.

THE NINTH CHAPTER of Job, is sublimely grand; and sets forth the Power of God in a beautiful Style, adorned with highly Poetic Figures. —The 26th, Chapter is beautiful; and we have already particularly noticed the 28th, Chapter, in our Observations on Scripture Geology and MINERALOGY.

THE 36th, and 37th, Chapters are very fine, and replete with beautiful Figures; but in the 38th, 39th, 40th, and 41st, Chapters, we arrive at the Climax of Sublimity, when God is represented as condescending to argue with Job, relating to the WORKS OF CREATION.

EXTRACT FROM COWPER'S MYSTERY OF PROVIDENCE.

"God moves in a mysterious way,
His wonders to perform;
He plants his footsteps in the sea,
And rides upon the storm.

Deep in unfathomable mines
Of never-failing skill,
He treasures up his bright designs,
And works his sovereign will.

Blind unbelief is sure to err,
And scan his work in vain:
God is his own Interpreter,
And he will make it plain."

CREATION AND PROVIDENCE, BY DR. WATTS.

"I sing th' almighty pow'r of God,
That made the mountains rise;
That spread the flowing seas abroad,
And built the lofty skies.

I sing the wisdom that ordain'd
The sun to rule the day:
The moon shines full at his command,
And all the stars obey.

I sing the goodness of the Lord,
That fill'd the earth with food:
He formed the creatures with his word,
And then pronounced them good.

Lord! how thy wonders are display'd,
Where'er I turn mine eye;
If I survey the ground I tread,
Or gaze upon the sky!

There's not a plant or flower below
But makes thy glories known;
And clouds arise, and tempests blow,
By order from thy throne.

Creatures (as numerous as they be)
Are subject to thy care;
There's not a place where we can flee,
But God is present there.

In heav'n he shines with beams of love;
With wrath in hell beneath!
'Tis on his earth I stand or move,
And 'tis his air I breathe.

His hand is my perpetual guard;
He keeps me with his eye:
Why should I then forget the Lord,
Who is for ever nigh"?

A HYMN ON THE CREATION,—BY ADDISON.

THE spacious firmament on high,
With all the blue etherial sky,
And spangled heavens, a shining frame,
Their great Original proclaim.
Th' unwearied sun from day to day
Does his Creator's power display,
And publishes to every land
The work of an Almighty hand.

Soon as the evening shades prevail,
The moon takes up the wondrous tale,
And nightly, to the listening earth,
Repeats the story of her birth;
While all the stars that round her burn,
And all the planets in their turn,
Confirm the tidings as they roll,
And spread the truth from pole to pole.

What though in solemn silence all
Move round the dark terrestrial ball?
What though nor real voice, nor sound,
Amid their radiant orbs are found?
In reason's ear they all rejoice,
And utter forth a glorious voice;
For ever singing, as they shine,
THE HAND that made us is DIVINE!

REMARK.

THESE BEAUTIFUL HYMNS, give us Grand and Sublime Ideas of the Omnipotence, the Omniscience, the Omnipresence, and the Creative Power and Goodness of the Almighty; and lead us directly to the Contemplation and Admiration of all his works, from the minutest Insect, to the Splendid and Spangled Canopy of the HEAVENS.

NOTES.

1. THE BOOK of Job, is the most ancient Poem in the World; its Author having lived about 1520 Years before Christ; whereas Homer died only about 907 Years before the CHRISTIAN ERA.

2. BOTH HOMER and Virgil have given beautiful descriptions of the Horse; but that in the Thirty-ninth Chapter of Job, is much superior to either, both for Sublimity, and Poetic Beauty of Figure.—In describing the Behemoth and the Leviathan, the Language of Job, is also SUBLIMELY GRAND.

3. THE UNICORN, mentioned in the Scriptures, and particularly in the 39th, Chapter of Job, is undoubtedly the Rhinoceros; and it is now well known, that there are two Species, one with a single Horn, and the other with two Horns.—In the 23rd, Chapter of Numbers, and the 22nd, Verse, we read, "God brought them out of Egypt; he hath as it were, the Strength of a Unicorn."—In Psalm 92nd, Verse 10th, David says, "My Horn shalt thou exalt like the Horn of a Unicorn."—Again, in Deuteronomy, Chapter 33rd, Verse 17th, it is said, "His [Joseph's] Horns are like the Horns of a Unicorn."

4. FROM these Quotations, it appears that Reference is made to both the single and the double Horned Rhinoceros; the former of which will suit some Passages of Scripture, and the latter other Passages.—REEM is the Arabic Name, for the Rhinoceros.—This Animal is reported, by the Arabs, to have but one Horn, till a certain Age, when a second appears; and some affirm, that a third appears, when the Animal grows old.—Both the single and the double horned Rhinoceros, may be seen in the BRITISH MUSEUM.

5. THE LEARNED BOCHART, and several others contend that the Behemoth, described in the 40th, Chapter of Job, is the Hippopotamus; that is, the Sea-horse, or more properly speaking, the River-horse, an amphibious Animal of the Nile, and some other Rivers.—But Franzius, Bruce, Scott, and some others, are of Opinion, that it is the Elephant; we do not, however, agree with them, in this Conclusion; although, it must be confessed, that some of the Characters given to the Behemoth, correspond to the Elephant, as well as to the Hippopotamus.

6. DR. ADAM CLARKE, and Dr. Good, are inclined to think, that the Sacred Writer refers to an Animal of an extinct Species; and Dr. Clarke, in particular, believes it to have been the Mestodon, or Mammoth.—He calculates that some of these Animals must have been *twenty-five* feet high, and *sixty feet* in Length; and would well answer to the Description given in the 19th, Verse; "He is the Chief of the WAYS OF GOD."

7. THE LEVIATHAN, described in the 41st, Chapter of Job, is without Doubt, the Crocodile; as no other Animal so well answers to the Strength, Courage, Intrepidity, Voracity, Armour, and other Characters,

ascribed to the Leviathan.—Dr. HARRIS says, “When a large Crocodile dives to the bottom, the violent Agitation of the Water, may be justly compared to Liquor boiling in a Caldron.—When he swims upon the Surface, he cuts the Water, like a Ship, and makes it white with Foam; at the same Time his Tail, like a Rudder, causes the Waves behind him, to froth and to sparkle, like a Train of Light.” (*See the 31st, and 32nd, Verses.*)

THESE IMAGES, and this figurative Mode of Expression, are common among the Poets.—Thus Homer, as translated by Pope :—

“ Now thro’ the rocks, appal’d with deep dismay;
We bend our course, and stem the desp’rate way ;
Dire *Scylla* there a scene of horror forms,
And here *Charybdis* fills the deep with storms.
When the tide rushes from her rumbling caves,
The rough rock roars ; tumultuous boil the waves ;
They toss, they foam, a wild confusion raise,
Like waters bubbling o’er the fiery blaze.”

(POPE’S ODYSSEY, BOOK XII., LINE 278.)

OBSERVATIONS ON THE IMMENSITY OF THE CREATION.

WHEN WE contemplate the Multiplicity of the Works of God, from the Microscopic Insect and Animalcule, through the whole of the Creation, up to the Millions of Fixed Stars, many of which can only be perceived by the Assistance of the best Telescopes ; we are launched into a Field that neither knows Bounds, Measure, nor End ;—our Senses are overpowered by the Immensity and the Magnitude of the Creation ;—we are lost in Admiration, Wonder, Love, and Praise ;—and our Minds are Elevated and Transported with the VIEW OF INFINITY.

EXTRACT FROM BLACKMORE’S POEM ON THE CREATION.

—“ SEE through this vast extended theatre
Of skill divine, what shining marks appear !
Creating power is all around exprest,
The God discover’d, and his care confest ;
Nature’s high birth her heavenly beauties show ;
By every feature we the PARENT know.
Th’ expanded spheres, amazing to the sight,
Magnificent with stars, and globes of light ;
The glorious orbs which heav’n’s bright host compose ;
Th’ imprison’d sea, resistless ebbs and flows ;
The fluctuating fields of liquid air,
With all the curious meteors hov’ring there,
And the wide regions of the land proclaim,
The POWER DIVINE, that rais’d the ALMIGHTY FRAME.”

ASTRONOMY.

ASTRONOMY being a Science of the Greatest Sublimity, we shall first take a Glance at our own Solar System, with the Sun in the Centre; and the Planets Mercury, Venus, the Earth, Mars, Jupiter, Saturn, and the Georgium Sidus, all revolving on their own Axes; and at the same Time, making their Revolutions round the Sun, in regular and stated Periods.

SEVERAL of these Planets are attended by Satellites or Moons, revolving round them; and which, with their *Primaries*, are carried round the Sun.—We all well know the benefit and the beauty of *One Moon*; but Jupiter has *Four Moons*, Saturn *Seven*, and the Georgium Sidus has *Six* Moons or Satellites.—We may also mention Jupiter's beautiful Belts, and Saturn's luminous *RINGS*.

BELONGING to our System, are also four later discovered, and smaller Planets or Asteroids; named Vesta, Ceres, Pallas, and Juno, all of which have their Orbits between those of Mars and Jupiter; and revolve on their own *Axis*, and also round the Sun; receiving their Light and Heat from him, in the same Manner as the other *PLANETS*.

THEN, we have the Comets, those luminous and eccentric Bodies, that sometimes visit our System; and that move round the Sun, in long elliptical Orbits; and whose Periods of Revolution have not yet been accurately determined by *ASTRONOMERS*.

NOTES.

1. COMETS generally appear with long fiery-looking Tails, somewhat resembling Hair; and are sometimes called *Blazing Stars*.—The Tail of the Comet which appeared in the year 1807, was 9,000,000 of Miles in Length; and that which made its Appearance in 1811, had a Tail, not less in Length, than 33,000,000 of Miles.—This Comet's Distance from the Sun, was 95,000,000 of Miles; and upwards of 142,000,000 of Miles from the *Earth*.

2. THE COMET which appeared in 1680, moves in a very eccentric Orbit; and its Period has been estimated to be 575 years.—The *greatest* Distance of this Comet, from the Sun, is 11,200,000,000 of Miles; and its *least* Distance from the Sun's Centre, was only 490,000 Miles.—Now, as the Sun's semi-diameter is no more than 441,605 Miles; it is evident that the Distance of the Comet, from the Surface of the Sun, was only 48,395 Miles.—In this Part of its Orbit, it travelled with the amazing Velocity of 880,000 Miles in an Hour.

THE DIAMETERS, DISTANCES, AND VELOCITIES OF THE SUN AND PLANETS.

OUR LIMITS will not permit us to enter into a detailed Account of the Heavenly Bodies; but we shall mention a few Particulars relating to their Diameters, Distances, Velocities, &c. &c., in order to inspire our Young Readers with a Desire for further Information on these very interesting and SUBLIME SUBJECTS.

NOTES.

1. THE PLANETS are not perfect Spheres, but Oblate Spheroids; having their Polar Diameters a little less than their Equatorial Diameters; and they all perform their Revolutions round the Sun, in Elliptical Orbits, differing but very little from Circles.—The Sun is situated in one of the focuses of the Elliptical Orbits of all the Planets; and by his Attraction, causes them to revolve round him, in Curved lines; otherwise their Projectile Force, would carry them off in Right Lines, into Infinite Space.

2. IN ORDER to Assist the Memory, we shall give the Diameters, Distances, and Velocities of the Sun and Planets, as nearly as we can in *Round Numbers*; and for more exact and detailed Descriptions, we must refer our Readers to the Works on Astronomy, mentioned on the Eighty-first Page of this MANUAL.

THE SUN.

THE SUN is the Source of Light and Heat, to all the Planets; and occupies the Centre of our Solar System.—His Diameter is about 883,210 Miles; his Distance from the Earth, 95,000,000 of Miles; and he performs his Revolution, on his Axis, in Twenty-five of our Days, with a Velocity of 4624 Miles in an Hour.

NOTES.

1. THE SOLIDITY, or Magnitude of the Sun, is 360,737,732,256,524,299 Cubic Miles;—namely, Three hundred and sixty thousand seven hundred and thirty-seven Billions, seven hundred and thirty-two thousand two hundred and fifty-six Millions, five hundred and twenty-four Thousand, two hundred and ninety-nine:—a Number almost surpassing the Powers of the IMAGINATION.

2. THE MAGNITUDE of the Sun, is much greater than that of the Earth, Moon, and all the other Planets and Satellites of our Solar System, added together; and his attractive or centripetal Force, is equal to the projectile or centrifugal Force of all the Planets; and hence, they move round the Sun, in nearly circular Orbits.—If the Planets were not retained in their Orbits, by the Attraction of the Sun, their projectile Velocities would carry them off, in straight Lines, into Infinite Space.—It may also be observed, that the Sun and Planets move round the Common Centre of Gravity of the System; and which Centre is nearly the CENTRE OF THE SUN.

3. THE DISTANCE of the Sun from the Earth, being 95,000,000 of Miles, a Cannon-ball, flying at the rate of eight Miles in a Minute, would be no less than 22 years, 216 days, 12 hours, and 40 minutes, in passing from the Earth to that GREAT ORB OF DAY.

4. SIR ISAAC NEWTON, Dr. Halley, and many other Astronomers, considered the Sun to be a *Large Globe of Fire*; but modern Astronomers have come to a very different Conclusion.—If the Sun was a Globe of Fire, the nearer we approached to it, the warmer we should find the Atmosphere; whereas we know the contrary to be the Fact;—witness the cold experienced by those who ascend in Balloons, and also our lofty Mountains, Capped with ETERNAL SNOWS.

5. As we ascend into the upper Regions of the Atmosphere, the Sun itself, appears diminished both in Splendour and Magnitude; and the Heavens, instead of the azure or blue, which we generally observe, approaches more and more towards a total Obscurity.—Thus it appears, that the Sun's Rays only produce Light and Heat, when they pass through proper Mediums, or fall upon CALORIFIC BODIES.

6. IF WE take a large burning Glass, and hold a piece of Iron in its Focus, such a Heat will be produced, as will melt the Iron; but the Glass through which the Rays pass, will scarcely be at all heated.—From this Experiment, it appears that the Sun's Rays, in themselves, have no Heat; and hence, there can be no Reason to suppose, that the Sun is hotter than the Globe which WE INHABIT.

7. THESE FACTS, to which many more might be added, are sufficient to expose the common Notion, that the Sun is a Globe of Fire; and at the same Time, to show that those Planets which are nearest to the Sun, are not necessarily the hottest; nor those the coldest, which are the most remote from him.—Hence, many of the fanciful Calculations relating to the Light and Heat experienced by the different Planets, fall to the ground; as it is obvious, from what we have stated, that by certain Modifications of the planetary Atmospheres, the Light and Heat may be equalized throughout the whole of OUR SOLAR SYSTEM.

8. DR. HERSCHEL is of Opinion, that the Sun is not a Globe of Fire;—but that it is an opaque Body, surrounded by a very extensive Atmosphere, of a luminous or phosphoric Nature; and composed of various elastic Fluids, that are more or less lucid and transparent.—He also concludes, that the Solar Rays are of THREE KINDS; namely, Rays which produce Light;—Rays which produce Heat;—and Rays which produce COLOUR.

9. THE SIMILARITY of the Sun, to the other Globes of our System, in Solidity, Density, Atmosphere, Surface, diversified with Mountains and Vallies; its Rotation on its Axis, &c. &c., leave us no Room to doubt, that like the Rest of the Planets, it is inhabited by Rational Beings, whose Organs and Constitutions, are adapted to their peculiar SITUATIONS and CIRCUMSTANCES.

10. As the Sun has an Atmosphere, Hills, Valleys, Seas, &c. &c.; and Revolves on its own Axis, like the other Planets, and is the Governour of our whole Solar System; we may very properly, in *Popular Language*, call the Sun—THE CENTRAL PLANET,—THE GRAND PLANET,—OR THE GREAT PLANET.

——— "Hail sacred source of inexhausted light!
 Prodigious instance of creating might!
 His distance man's imagination foils;
 Numbers will scarce avail to count the miles.
 His globous body how immensely great!
 How fierce his burnings! How intense his heat!
 As swift as thought he darts his radiance round
 To distant worlds his system's utmost bound:
 Of all the planets the directing soul,
 That heightens and invigorates the whole."

BROWNE,

NOTE.—It will be seen, that when the preceding Lines were written, the Poet considered the Sun to be a **GLOBE OF FIRE**.

MERCURY.

MERCURY is the nearest Planet to the Sun, and has a bright Appearance; but can seldom be seen by the naked Eye, being generally lost in the Splendour and Refulgence of that Luminary.

Mercury is but a small Planet, his Diameter being only about 3,000 Miles; and he completes his Revolution round the Sun, in 87 Days, 23 Hours and a quarter; at the Distance of 37,000,000 of Miles.—This Planet moves, in its Orbit, with the amazing Velocity of 110,000 Miles per Hour.

NOTE.—The Term Orbit, means the Path described by a Planet, in its Course round the Sun, or by a Moon or Satellite, round its Primary Planet.

VENUS.

VENUS is the Second Planet from the Sun; and is easily distinguished by her superior Brilliancy.—Her Diameter is 7,900 Miles; and she performs her Revolution, on her Axis, in about Twenty-four Hours, with a Velocity of 1,034 Miles per Hour.

Her mean Distance from the Sun, is 69,000,000 of Miles; she completes her annual Revolution round that Luminary, in 225 Days; and she moves in her Orbit, at the Rate of 80,285 Miles in an Hour.

NOTES.

1. THE Length of Venus's Year, is only 225 of our Days; or not quite two-thirds of our Year.

2. VENUS is a Morning Star, when she is seen west of the Sun, for then she rises before him; and when we see her east of that Luminary, she is an Evening Star, for then she sets after the Sun.

3. IN the Language of the Poets, Venus is called Phosphorus, or Lucifer, when she is a Morning Star; and Hesperus, or Vesper, when she is an Evening Star.

THE EARTH.

THE EARTH is the third Planet from the Sun; its mean Distance from that Luminary, being about 95,000,000 of Miles; its Diameter is found to be about 7,920 Miles; and its Circumference nearly 25,000 Miles.

THE EARTH revolves on its Axis, in about 24 Hours, by which the Inhabitants of the Equator, are carried from West to East, at the Rate of 1,040 Miles in an Hour; but the Inhabitants of London move only with a Velocity of about 646 Miles per Hour; in Consequence of the Degrees of Longitude, in the Parallel of the Latitude of London, (51 Degrees 32 Minutes North,) being less than they are at the EQUATOR.

THE EARTH performs its Revolution round the Sun, in about $365\frac{1}{4}$ Days, which is nearly the Length of our Year; and it moves with a Velocity of about 68,000 Miles in an Hour; or nearly 19 Miles every Second of Time; and yet we do not perceive this wonderfully rapid Motion, nor even its Revolution on its Axis.

NOTES.

1. LAPLACE makes the polar Diameter of the Earth to be in the Proportion to the equatorial, as 331 is to 332; the equatorial Diameter he makes 7,924 Miles; consequently the polar Diameter is 7,900 Miles, and the mean Diameter 7,912 Miles.

2. SOME PERSONS may be inclined to doubt the Correctness of the Astronomical Calculations, relating to the Diameters, Distances, and Velocities of the Sun, Moon, and Planets; but any Doubt on this Subject will vanish, when we take into Consideration the Accuracy with which the Eclipses of both the Sun and Moon, and also the Transits of Mercury and Venus, over the Sun's Disc, are computed for many Years before they take Place, even to a SECOND OF TIME.

3. THE METHODS of finding the Distances of the Sun, Moon, and Planets, from the Earth; and also their Diameters and Velocities, may be seen in Martin's Trigonometry, Vol. I.—Page 208;—Ferguson's Astronomy, Page 100;—Squire's Astronomy, Page 155;—Guy's Astronomy, Page 134;—and at the 27th. Page of Bonnycastle's Astronomy.—See also, the 11th, 12th, and 13th, Chapters of Dr. Olinthus Gregory's ASTRONOMY.

4. THE METHODS of calculating both Solar and Lunar Eclipses, may be seen in the 18th, and 19th, Chapters of Ferguson's Astronomy; and in the 19th, Chapter of Dr. Gregory's Astronomy.—Dr. Keill,—and also Vince, and Woodhouse, have given the Methods of calculating Eclipses

of both the Sun and the Moon, in their respective Treatises on Astronomy.—Professor Vince's Treatise, is an Elaborate Work, in 3 Vols. 4to.—Price FIVE GUINEAS.

5. ECLIPSES are of great Use, in Astronomy; for by the Eclipses of the Moon, we determine the spherical Figure of the Earth; and also find that the Sun is larger than the Earth, and the Earth greater than the Moon.—In Geography, Eclipses discover the Longitude of different Places; and in Chronology, both Solar and Lunar Eclipses serve to determine exactly the Time of any past Event; if we have only a true and an accurate Record of the PHENOMENA.

6. THE ECLIPSES of the Sun and Moon, the Transits of the Planets, and other Occultations;—also, the Conjunctions and Oppositions of the Heavenly Bodies, &c. &c., are always calculated, by the Astronomer Royal, for several future Years; and published in the Nautical Almanac, for the Convenience of Ships, going out upon LONG VOYAGES.

THE MOON.

THE MOON is a Satellite to the Earth we inhabit, and about which she revolves in an elliptical Orbit, from one New Moon to another, in 29 Days, 12 Hours, and 44 Minutes, very nearly.

The Moon's Diameter is about 2,180 Miles; her mean Distance from the Earth, is 240,000 Miles; and she moves, in her Orbit, at the Rate of 2,127 Miles in an Hour.

The Shades which appear on the Surface of the Moon, are found, when viewed through a Telescope, to result from the Diversity of her Mountains and Valleys; and when she is either horned or gibbous, the irregularity of her surface may be clearly discerned, by the indented or jagged Appearance of her Edge or Border.

DR. HERSCHEL has determined that very few of the Mountains in the Moon, are more than half a Mile, in perpendicular Height; and he also discovered several Volcanoes, some of them emitting Fire, in the same manner as those on the Earth; and, indeed, there appears no Reason to doubt, that she has also Rivers, Seas, and an ATMOSPHERE; and is inhabited by rational Beings, who are capable of adoring their ALMIGHTY CREATOR.

NOTES.

1. THE Circumference of the Moon being only about 6,848 Miles; and as her Revolution on her Axis, is performed in 29 Days, 12 Hours, and 44 Minutes; we find that she moves only with a Velocity of about Nine Miles and a half per Hour.

2. THE Moon always keeps the same Side towards the Earth; hence it appears that her Rotation on her Axis, is performed in the same

time as her Revolution through her Orbit; and that her Day and Night, taken together, are just the Length of our lunar Month; each being as long as from the New Moon to the Full Moon.

3. We may likewise observe that the Length of Mercury's Year, is 87 Days 23 Hours, and a quarter; and the Length of his Day is one of our Days, five Minutes and a half; this being the Time in which he performs his Revolution on his Axis.—Venus's Year is 225 of our Days; and her Day is nearly the same Length as our own, being about 24 Hours.

MARS.

THE PLANET MARS, is about 4,200 Miles in Diameter; his Distance from the Sun, is about 144,760,800 Miles; and he completes his Revolution round that Luminary, in about 687 of our Days, which Time is the Length of his Year.

MARS moves in his Orbit, at the Rate of about 55,165 Miles in an Hour; and performs his diurnal Motion, on his Axis, in 24 Hours, and 39 Minutes; this being the Length of his DAY.—His Velocity, on his Axis, is 535 Miles per Hour.

NOTES.

1. MARS's Year is equal to One Year, Eleven Months, and 13 Days of our Time; and his mean Distance from the Sun, is more than *one-and-a-half* Times that of the Earth.

2. This Planet has a very considerable Atmosphere; hence, we may infer, that his Inhabitants enjoy a Situation and Temperature, in many Respects, similar to the Inhabitants of our GLOBE.

JUPITER.

JUPITER's Orbit lies between those of Mars and Saturn; and he is the largest of all the Planets, his Diameter being upwards of 91,500 Miles. He performs his Revolution, on his Axis, in rather less than Ten Hours, with the amazing Velocity of 28,740 Miles in an Hour.

THE Distance of Jupiter, from the Sun, is estimated at 494,260,000 Miles; and he completes his Revolution round that Luminary, in 4332 of our Days, with a Velocity of 29,870 Miles in an Hour.

NOTES.

1. JUPITER generally appears nearly as brilliant as Venus; and like her, is alternately an Evening and a Morning Star.

2. THE Magnitude of Jupiter is 1,330 Times more than the earth's; and his Year is nearly equal to 11 years, 11 Months, and 8 Days of our Time.

3. JUPITER's four Moons, in their nightly Courses through the Heavens, must afford many curious Phenomena to his Inhabitants, by

frequently eclipsing each other, &c. &c.; and the Sun and the Stars, must be highly interesting, particularly to the *Astronomers* of that Distant World.

SATURN.

THE DIAMETER of Saturn, is nearly 80,000 Miles; and he revolves on his Axis, in about Twelve Hours and a quarter; with a Velocity of 20,516 Miles in an Hour.

THE Distance of Saturn, from the Sun, is upwards of 900,000,000 of Miles; and he completes his Revolution, round that *Great Orb*, in 10,759 Days; with a Celerity of 21,900 Miles per Hour.

NOTES.

1. THE MAGNITUDE of Saturn, is upwards of 1,000 Times that of the Earth; his Day is only Twelve Hours and a quarter of our Time; but his Inhabitants have a very long Year; it being nearly equal to Thirty of our YEARS.

2. THE PLANET Saturn, is one of the most engaging Objects that Astronomy presents to our View; being surrounded by a double Ring, and seven Satellites, all visible, by the Assistance of a good Telescope.—In some peculiar Situations, Saturn and his bright Moons, and his luminous Rings, present to our View, one of the most beautiful and charming Scenes, that it is possible for the Mind of MAN to CONCEIVE.

THE GEORGIUM SIDUS.

THE GEORGIUM SIDUS, or Herschel, is the most remote Planet, that has yet been discovered, in our System; his Distance from the Sun, being more than 1,800,000,000 of Miles; and he performs his *Annual Revolution*, in 30,689 of our Days, with a Velocity of nearly 15,350 Miles per Hour.

THIS PLANET is named Uranus, by some Continental Astronomers; but it ought to bear the Name of Herschel, in honour of Dr. Herschel, who discovered it, in the Night of March 13th, 1781, when he was at Bath.

THE DIAMETER of Herschel, is estimated at 35,860 Miles; but his diurnal Rotation, on his Axis, has not yet been discovered;—Laplace, however, concludes that the Time of his Rotation, cannot be much less than that of JUPITER or SATURN.

NOTES.

1. THE INHABITANTS of Herschel have a Year which is nearly equal to 84 of our Years; and it is reasonable to conclude, that there is scarcely any Part of his Orb, but what is constantly enlightened by one or other of his SIX SATELLITES.

2. The Earth is about fourteen Times larger than Mercury;—very

little more than Venus; and three Times as large as Mars.—But, Jupiter is more than thirteen hundred Times as large as the Earth ;—Saturn, upwards of a thousand Times as large ;—and the Magnitude of Herschel, is about eighty Times that of our PLANET.

ANTIQUITY OF ASTRONOMY.

ASTRONOMY is undoubtedly a Science of very great Antiquity; and we may fairly date its Origin as being nearly coeval with the CREATION OF MAN.

It is natural to suppose, that the varying Lengths of the Days and Nights ;—the Changes in the Seasons ;—the New and Full Moons ;—the Risings and Settings of the Sun, Moon, Planets, and Fixed Stars ;—but, above all, the wonderful Operations of Eclipses, would very soon lead Adam and his Posterity, to observe these Phenomena of the Heavenly Bodies, with no ordinary DEGREE OF ATTENTION.

JOSEPHUS, in his Antiquities, when speaking of the Progress made in Astronomy, by Seth and his Posterity, before the Deluge, asserts that they engraved the Principles of the Science, on two Pillars; one of Stone, and the other of Brick; and that the former of these, remained entire, in HIS TIME.

MR. BAILLY, in his History of Astronomy, informs us that this Science was cultivated, among the Chaldeans, Egyptians, Persians, Indians, and Chinese, very soon after the Flood; and we find that Arcturus, Orion, and the Pleiades, are all mentioned in the Ninth Chapter of the BOOK OF JOB.

By a Combination and Coincidence of various Evidence, derived from History, Chronology, and Astronomy, Dr. Hales fixes the Time of Job's Trial, to about 818 Years after the Deluge; or about 1530 Years before the CHRISTIAN ERA.

SEVERAL of the Constellations are mentioned by the Poets, Hesiod and Homer, the two most ancient Writers among the Greeks; and who lived about 870 Years before Christ.—Thales, who was born about 640 Years before Christ, calculated Eclipses of both the Sun and Moon; and Astronomy was further cultivated and extended by his successors, Anaximander, Anaximenes, and Anaxagoras; but more especially by Pythagoras, who was born about 577 Years before the CHRISTIAN ERA.

FROM CHALDEA and Egypt, the Science of Astronomy passed into Phenicia; and this People very ingeniously

applied it to the Purposes of Navigation, steering their Course by the *North Pole Star*; whence they became Masters of the Seas, and of almost all the COMMERCE in the WORLD.

THE FIXED STARS.

EXTRACT FROM DR. YOUNG'S NIGHT THOUGHTS.

—“ Who turns his eye on Nature's midnight face,
But must enquire—What hand behind the scene,
What arm Almighty, put those wheeling globes
In motion, and wound up the vast machine?
Who rounded in his palm, these spacious orbs?
Who bowl'd them flaming through the dark profound,
And set the bosom of old Night on fire?
Nature's Controller, Author, GUIDE and END”!

THE FIXED STARS include all the Heavenly Bodies, that are beyond our own Solar System; and are called FIXED, because they are observed to keep the same distance with Regard to each other; and do not appear to have any proper Motion of their own, like the PLANETS.

THEY are all at immense distances from the Earth, and from each other; and are considered to be SUNS to different Systems;—each Star being supposed to be the Centre of its own System of Worlds or Planets; and governing them in the same Manner that our Sun controls the SOLAR SYSTEM.

NOTES.

1. THE NUMBER of Stars, to a common observer, may seem innumerable; but, by the Naked Eye, we can seldom discover more at a Time, than a Thousand.—However, since the Invention of Telescopes, the Number of Stars has been very justly considered as immense: for the greater the magnifying Power of our Glasses, the more Stars we can discover, in HEAVEN'S WIDE EXPANSE.

2. M. F. LALANDE has determined the Places of 50,000 Stars, in only a very small portion of the ethereal Expanse; and in that Part of the Heavens, called the *Milky Way*, Dr. Herschel has seen 116,000 Stars pass over the Field of his Telescope, in a quarter of an Hour; hence, it appears that there is no Bounds to the Number of the Stars, or to the Extent of the UNIVERSE.

3. DR. HERSCHEL says, that several of the Fixed Stars revolve on their Axis, like the Sun and Planets; and he also observes, that their immense Distance would perfectly exclude them from our View, if they did not, like our Sun, shine by their own Light; and hence he concludes, that all the Stars are Suns and Centres to Millions of Systems of WORLDS.

4. THE IMMENSE DISTANCE of the Fixed Stars, from the Earth, and from each other, is of all Considerations, the most proper for exalting

our Ideas, relating to the Works of God; and the Extent of the Creation.—Sirius, or the Dog-star, is the largest in Appearance, and is consequently considered to be the nearest; yet, Professor Vince says, that its Distance cannot be less than 38,000,000,000,000 of Miles from the EARTH.

5. THIS DISTANCE is amazing, and so immense, that a Cannon Ball, flying from the Earth, with the Velocity of 400 Miles in an Hour, would not reach Sirius in less than 10,837,326 years; and Sound, which travels at the rate of 778 miles per Hour, would not accomplish this Distance in less than 5,571,889 YEARS.

6. THE VELOCITY of a Cannon Ball, is great; that of Sound is still greater; and the Velocities of the Planets on their Axes, and in their Orbits, are astonishing;—but all these Velocities seem to vanish, when they are compared with the amazing Velocity of Light, and with that of Electricity.—Light glances with a Celerity of 192,500 Miles in a Second; and Electricity flashes with a Velocity of 288,000 Miles in the same TIME.

7. WE HAVE calculated that a Cannon Ball would occupy 10,837,326 Years, and Sound 5,571,889 Years, in passing between the Earth and the nearest Fixed Star;—whereas, we find, by Computation, that Light would require no more than SIX YEARS and a Quarter; and Electricity only FOUR YEARS and a Quarter, in performing the same Distance.—Such is the Creative Power of the ALMIGHTY!!!

8. AS THERE is a general Analogy running through and connecting every Part of the Creation into ONE GRAND UNIVERSE; and as there is an absolute Similarity between our Sun and the Fixed Stars, and between the Earth we inhabit, and the other Planets in our System; we may justly draw the Conclusion, that all our Planets, as well as the Planets governed by other Suns, have Trees, Plants, Herbs, Fruits, Flowers, &c. &c.; and are inhabited by Animals, and by RATIONAL BEINGS.

9. NO PART of Matter with which we are acquainted, lies waste or unoccupied;—Oceans, Seas, Lakes, and Rivers, teem with living Creatures;—Mountains and Valleys;—Trees and Herbs;—Plants and Grasses;—and the Animals that feed upon them;—nay, even the very Blood and Humours of the Animals themselves, all have their respective Inhabitants.—Surely, then, the most numerous and the largest Bodies in the UNIVERSE, are furnished with Beings adapted to their several Situations; and to the Temperature and Climates of the Planets which THEY INHABIT.

10. WHAT an august Conception does this give us, of the manifold and mighty Works of the CREATOR!! Almost more than the human Imagination is able to conceive.—Instead of One Sun, and One System of Worlds;—there are Millions of Suns, at immense Distances from each other; attended by Tens of Millions of Worlds moving round them, all in rapid Motion; yet calm, regular, and harmonious; and these Worlds peopled with Myriads of intelligent Beings, formed for endless Progression in PERFECTION AND FELICITY!!!

“These are thy glorious Works, Parent of Good,
Almighty; thine these universal Frames,
Thus wonderous fair; THYSELF, how wonderous THEN”!!!

MILTON.

EXTRACT FROM DR. GREGORY'S ASTRONOMICAL LESSONS.

"INSTEAD, then, of one Sun and one World only, in the Universe, as the Unscientific suppose, our Contemplations induce us to acknowledge that there must be an inconceivable Number of Suns and of Systems of Planets revolving round them, dispersed through the infinitely wide Expanse of boundless Space: insomuch, that were our Sun, with all the Planets about it, annihilated, they would be no more missed by an Eye that could take in the whole Creation, than a Drop of Water from the wide Ocean.—These Reflections tend to excite a deep Consciousness of our own Inferiority.—Who can help exclaiming with *David*, after a similar Contemplation,—‘*LORD what is Man, that thou art mindful of Him*’?"

EXTRACTS FROM BONNYCASTLE'S ASTRONOMY.

"WHAT a magnificent Idea of the Creator and his Works, is here presented to the Imagination!—The Sun, a Stupendous Body, is placed in the Centre of the System; and round its Orb, the Planets, Satellites, and Comets, perform their Revolutions, with an Order and Regularity which must fill our Minds with the most exalted Conceptions of their DIVINE ORIGINAL."

"Who can contemplate the Magnitudes and Distances of these immense Bodies, and the beautiful Harmony of their Motions, and not be struck with the Grandeur of the Scene; and the Power of Omnipotence!—But what must be our Astonishment, when we are told, that this Glorious System, with all its superb Furniture, is only a small part of the Universe; and if it could be wholly annihilated, would be no more missed, by an Eye which could take in the whole Creation, than a grain of sand from the SEA-SHORE."

"To form a proper Idea of the Extent of the Universe, and the more glorious Works of Creation, we must turn our Attention to the starry Firmament; and visit those numerous and splendid Orbs, which are every where dispersed through the Heavens, far beyond the Limits of our PLANETARY SYSTEM."

"It is in these higher Regions, that the Deity has displayed himself in such indelible Characters, as must rouse the most insensible Spectator; and fill his Mind with Admiration and Astonishment.—By contemplating the Magnitudes and Distances of the Fixed Stars, all partial Considerations of high and low, great and small, vanish from the Mind; and we are presented with such an unbounded View of Nature, and the immensity of the Works of the Creation, as overpowers all our faculties, and makes us ready to exclaim with the Psalmist, ‘*LORD what is Man, that thou art mindful of him, or the Son of Man, that thou REGARDEST HIM*’?"

EXTRACT FROM DR. YOUNG'S NIGHT THOUGHTS.

"WHENCE earth and those bright orbs?—Eternal?
 Grant matter was eternal; still these orbs
 Would want some other father;—much design
 Is seen in all their motions, all their makes;
 Design implies intelligence and art:
 That can't be from themselves—or man: That art
 Man scarce can comprehend, could man bestow?
 And nothing greater yet allow'd than man.—
 Who, motion, foreign to the smallest grain,
 Shot through vast masses of enormous weight?
 Who bid brute matter's restive lump assume
 Such various forms, and gave it wings to fly?
 Has matter innate motion? then each atom
 Asserting its indisputable right
 To dance, would form an universe of dust:
 Has matter none? then whence these glorious forms,
 And boundless flights, from shapeless and repos'd?
 Has matter more than motion? has it thought,
 Judgment, and genius? is it deeply learn'd
 In Mathematics? has it framed such laws,
 Which, but to guess, a NEWTON made immortal?
 If so, how each sage atom laughs at me,
 Who think a clod inferior to a man!
 If art to form; and counsel, to conduct;
 And that with greater far than human skill,
 Resides not in each block;—a GODHEAD REIGNS."

EXTRACT FROM THE REV. JOHN WESLEY'S HYMNS

"ETERNAL Wisdom! Thee we praise,
 Thee the creation sings:
 With thy lov'd name, rocks, hills, and seas,
 And heav'n's high palace rings.

Thy hand, how wide it spreads the sky,
 How glorious to behold!
 Ting'd with a blue of heavenly dye,
 And starr'd with sparkling gold.

There, thou hast bid the globes of light
 Their endless circuits run:
 There, the pale planet rules the night;
 The day obeys the sun.

If down I turn my wond'ring eyes
 On clouds and storms below ;
 Those under-regions of the skies
 Thy numerous glories show.

The noisy winds stand ready there,
 Thy orders to obey ;
 With sounding wings they sweep the air,
 To make thy chariot way.

There, like a trumpet loud and strong,
 Thy thunder shakes our coast ;
 While the red lightnings wave along,
 The banners of thy host.

On the thin air, without a prop,
 Hang fruitful showers around ;
 At thy command they sink and drop
 Their fatness on the ground.

Lo ! here thy wond'rous skill arrays
 The earth in cheerful green ;
 A thousand herbs thy art displays,
 A thousand flowers between.

There the rough mountains of the deep
 Obey thy strong command ;
 Thy breath can raise the billows steep,
 Or sink them to the sand.

Thy glories blaze all nature round,
 And strike the wond'ring sight,
 Through skies, and seas, and solid ground,
 With terror and delight.

Infinite strength, and equal skill,
 Shine through thy works abroad ;
 Our souls with vast amazement fill,
 And speak the BUILDER GOD" !

NOTE.—THE PIECES of Poetry with which this Essay is interspersed may be easily committed to Memory by Young Persons ; and they then be able, at any Time, to call to mind many of the Attributes of the ALMIGHTY.

THE MINUTENESS OF THE CREATION.

WE have taken a Glance at a few of the Great and Mighty Works of the Creator; and noticed his Power, as displayed, in the Formation of the Sun, the Planets, and the Fixed Stars; but when we come to contemplate the Millions of Insects and Animalcules which can only be perceived by the most powerful Microscopes; yet, full of Perfection, and teeming with Life, and with Action; we are again at a Loss for Words, to express our Wonder at the Creative Power of the ALMIGHTY.

BUT, it is not in the living State alone, that these minute Parts of the Creation may be discovered; for many Rocks and Beds of Stone, in the interior of Continents, at various Depths in the Earth, and at great Heights above the Level of the Sea, are almost entirely composed of the Remains of Zoophytes, very small Testacea, the Skeletons of extremely minute Corallines, and various other MICROSCOPIC ANIMALCULES.

PROFESSOR EHRENBURG of Berlin, has discovered, that a certain Kind of siliceous Stone, called TRIPOLI, is entirely composed of Millions of the Skeletons or Cases of microscopic Animalcules.—The Substance to which we allude, has long been well known, in the Arts; being used in the Form, of a Powder, for polishing STONES AND METALS.

AMONG other Places, it has been procured from Bilin, in Bohemia, where a single Stratum, extending over a wide Area, is no less than Fourteen Feet in Thickness.—This Stone, when examined with a powerful Microscope, is found to consist of the siliceous Cases of Infusoria, united together without any visible CEMENT.

It is very difficult to convey an Idea of their extreme Minuteness; but Ehrenberg has estimated, that in the Bilin Tripoli, there are 41,000 Millions of Individuals in every cubic Inch, which weighs about 220 Grains; or nearly 187 Millions, in a Single Grain.—At every Stroke, therefore, that we make with this polishing Powder, several Millions, perhaps tens of Millions of perfect Fossils, are crushed to ATOMS.

How AMAZING, that Creatures so extremely minute, yet,

so perfect, and so full of Life, Animation, and Activity, should exist, or that they ever should have existed ;—indeed, their Creation shows forth the Infinite Power of God, in almost as great a Degree, as the Creation of Millions of Suns, and Tens of MILLIONS of WORLDS !!!

MORAL PHILOSOPHY.

MORAL PHILOSOPHY, or ETHICS, is the Science of Morals:—it investigates the Grounds and Reasons of Duty:—it traces that Quality of Actions and Dispositions, which renders them obligatory upon a reasonable BEING like MAN:—it shows what classes of Actions and Dispositions possess this Quality:—it ascertains, by these Means, the best RULE of LIFE:—and it lays down those Principles that, by the Aid of this Rule of Life, may be most successfully applied, as regards our own MORAL CONDUCT, and our GENERAL TRANSACTIONS with the WORLD.

WORKS ON MORAL PHILOSOPHY.

THE PROVERBS OF SOLOMON were written about One thousand Years before the Christian Era ; and form the Oldest Work on ETHICS that has reached our Times ; we shall, therefore, first recommend its careful Perusal to our Young Friends, particularly French and Skinner's Translation, with explanatory Notes.

THE APOCRYPHAL Books, entitled, "The Wisdom of Solomon,"—and "Ecclesiasticus," contain many fine Moral Instructions, Theological Precepts, and Religious Sentiments ; and may be read, with great Advantage, by Young Persons, particularly the latter Book.

LOCKE'S CONDUCT of the Understanding, Watts's Improvement of the Mind, Mason's Self Knowledge, Blakey's System of Logic, and Whately's Elements of Logic, may be consulted with great Advantage ; and are of a convenient Size for the Use of Schools.

DR. PALEY'S MORAL PHILOSOPHY has been much read and recommended ; and, in many Respects, it is an excellent Work ; but it is founded on Principles which have led the Author himself to some erroneous Conclusions ; and which have produced this Effect to a still greater Extent, among his Readers.—In connexion with Paley, we most strongly recommend the Study of Pearson's Remarks on the Theory of Morals, and his Annotations on the Practical Part of Paley's Moral Philosophy ; — Gisborne's Principles of Moral Philosophy ; — Hartley's Rule of Life ;—and Dr. Reid's Essays on the INTELLECTUAL and ACTIVE POWERS of MAN.

Besides these valuable Works, we may mention Bowring's Minor Morals for Young People ;—Coleridge's Aids to Reflection, on the Grounds of

Prudence, Morality, and Religion;—Dick's Mental Illumination and Moral Improvement of Mankind;—Gisborne's Duties of Men;—Morgan's Sketches of the Philosophy of Morals;—Dr. Knox's Literary and Moral Essays;—Dr. Chalmers's Moral Philosophy;—and Percival's Literary, Moral, and Philosophical Works, in FOUR OCTAVO VOLUMES.

NOTE.—The preceding Works contain many excellent Rules and Directions for the Moral Government, Correct Conduct, and Circumspect Behaviour of MAN; but the best Treatise on Moral Philosophy, is the NEW TESTAMENT; as it strikes at the very Root of all Evil, and is directed even against the most secret Thoughts of the HEART.

THEOLOGY AND RELIGION.

THEOLOGY is the Science which instructs us in the Knowledge of GOD, and Divine Things; or which has God and the Things that he has revealed, for its objects.—It is generally divided into two Branches, *Natural* and *Supernatural*.—*Natural Theology*, is the Knowledge we have of God from his Works, by the Light of Nature and Reason; and *Supernatural Theology*, is that which we learn from REVELATION.

RELIGION teaches us what we are to believe of GOD, and of his Attributes, as his Wisdom, his Goodness, his Justice, his Mercy, his Omniscience, his Omnipresence, his Omnipotence, &c. &c.; and how we are to serve him, in Order that we may obtain Everlasting Life, through the MERITS and INTERCESSION of the SAVIOUR OF THE WORLD.

THE BIBLE, (consisting of the Old and New Testament,) contains the Doctrines of Christianity; and is superior, in Excellence, to ALL OTHER BOOKS; many Good Works have, however, been written by different Persons, on the Subject of CHRISTIANITY; a few of which we shall mention, as well deserving the particular Attention of our Young Readers, because they treat on the most IMPORTANT OF ALL SUBJECTS.

EXTRACTS FROM VARIOUS AUTHORS.

LORD BROUGHAM says, "The words *Theology* and *Religion* are often used as synonymous.—Thus, *Natural Theology* and *Natural Religion*, are, by many, confounded together.—But the more accurate use of the words, is that which makes *Theology* the Science, and *Religion* its Subject; and in this manner they are distinguished, when we speak of a "PROFESSOR OF THEOLOGY," and a "SENSE OF RELIGION."—Lord Brougham's *Discourse on Natural Theology*.

THE REV. RICHARD WATSON says, "By Christianity is meant, not that Religious System as it may be understood and set forth in any particular Society, calling itself Christian; but as it is contained in the Sacred Books, acknowledged by all these Societies or Churches, and which contain the only authorized Rule of Faith and Practice.

"The lofty Profession which Christianity makes, as a Religion, and the promises it holds forth to mankind, entitle it to the most serious consideration of all. For it may, in truth, be said, that no other Religion presents itself under aspects so sublime, or such as are calculated to awaken desires and hopes so enlarged and magnificent. It not only professes to be from God, but to have been taught to MEN, by the SON OF GOD."—*Watson's Theological Dictionary*.

THE REV. J. ROBINSON says, "Religion has been defined the love of God kindled in our Souls, and producing obedience to HIS WILL.—All Religion supposes and takes for granted the clear and undoubted principles of Natural Religion.—By Natural Religion, is meant obedience to the natural law, and the performance of such duties, as natural light, without any express and supernatural revelation, dictates to Men. Such as, that we should depend on God, implore his aid and assistance in all our necessities and distresses, and acknowledge our obligation to him for all the blessings and benefits which we receive; that we should moderate our appetites, with respect to the pleasures and enjoyments of this world, and use them temperately and chastely; that we should be just and upright in all our dealings, true to our word, faithful to our trust, and act by others, as we would they should act by us; that we should be kind and charitable, merciful and compassionate; ready to do good to all, and not only to pity, but relieve, if we can, the miserable and necessitous."

"These and such like particulars, are what we call moral duties; and they are of eternal obligation, because they naturally oblige men, without any express revelation from God. And these great and fundamental duties are the foundation of revealed and instituted Religion; for all revelation from God, supposes us to be men, and alters none of those duties, to which they were before naturally obliged."

"THE NEW TESTAMENT declares it to be the great design of the Gospel, to instruct us in those duties; and engage us to the practice of them.—RELIGION supplies the only Safe Rule of Life, which a man may follow without the danger of being led wrong. 'He that followeth me,' says our Saviour, 'shall not walk in darkness, but shall have the light of life;' for nothing in the material universe so well represents its nature or describes its usefulness.—Religion alone teaches us how to employ our faculties, both of mind and body, in a manner most conducive to our own welfare; and suitable to the END for which we came into the WORLD."—*Robinson's Theological Dictionary*.

WORKS ON NATURAL THEOLOGY.

AMONG the early Works on Natural Theology, we may mention Ray's *Wisdom of God, Manifested in the Works of Creation*; which was published sometime between the Years 1682, and 1693.—Derham's *Physico-Theology* appeared in 1713; and in 1714, he published his *Astro-*

Theology; both being the substance of his Boyle's Lectures, with *large* Notes, and *curious* Observations.

DR. PALEY's Celebrated Work on Natural Theology, appeared in 1802; and has been much read, and deservedly applauded; and we cannot too highly recommend Lord Brougham's Discourse of Natural Theology; and Paley's Natural Theology, with Illustrative Notes, by Lord Brougham, and Sir Charles Bell.

We must also mention Fenelon on the Existence of God;—Rennie's Alphabet of Natural Theology;—Sumner's Records of the Creation and Moral Attributes;—Crombie's Natural Theology;—Duncan's Sacred Philosophy;—Physical Theory of Another Life;—Macculloch's Attributes of God;—and DR. CHALMERS'S NATURAL THEOLOGY.

THE BRIDGEWATER TREATISES.

THE RIGHT HONOURABLE and Rev. Francis Henry, Earl of Bridgewater, died in the Month of Feb. 1829; and in his Last Will and Testament, bearing date the 25th, of Feb. 1825, he directed certain Trustees, therein named, to invest, in the Public Funds, the Sum of £8000; and this Sum, with accruing Dividends, to be held at the Disposal of the President for the Time being, of the Royal Society of London, to be paid to the Person or Persons nominated by him.

The Testator further directed, that the Person or Persons, selected by the said President, should be appointed to write, print, and publish 1000 Copies of a Work "On the Power, Wisdom, and Goodness of God, as manifested in the Creation;" illustrating such Work, by all reasonable Arguments, as for Instance, the Variety and Formation of God's Creatures, in the Animal, Vegetable, and Mineral Kingdoms; by discoveries, ancient and modern, in the Arts, and Sciences; and by an infinite Variety of other Arguments, extending through the whole COURSE OF LITERATURE.

The Testator also devised, that the Profits of the different Works should be given to their respective Authors.—Now, in Pursuance of this Will and Testament, the following Gentlemen were appointed to write on Particular Subjects; and their Works have been published, and add greatly to the HONOUR OF ENGLISH LITERATURE AND SCIENCE:—

1.—THE REV. ROBERT CHALMERS, D.D., On the Power, Wisdom, and Goodness of God, as manifested in the Adaptation of External Nature, to the Moral and Intellectual Constitution of MAN.

2.—JOHN KIDD, M.D., F.R.S., On the Adaptation of External Nature, to the Physical Condition of MAN.

3.—THE REV. WILLIAM WHEWELL, M.A., F.R.S., On Astronomy and General Physics, considered with Reference to NATURAL THEOLOGY.

4.—SIR CHARLES BELL, F.R.S., On the Hand; its Mechanism and Vital Endowments, as evincing DESIGN.

5.—PETER MARK ROGET, M.D., On Animal and VEGETABLE PHYSIOLOGY.

6.—THE REV. WILLIAM BUCKLAND, D.D., F.R.S., On Geology and Mineralogy, considered with reference to NATURAL THEOLOGY.

7.—THE REV. WILLIAM KIRBY, M.A., F.R.S., On the Power and Goodness of God, as manifested in the Creation of Animals, and in their History, Habits, and *Instincts*.

8.—WILLIAM PROUT, M.D., F.R.S., On Chemistry, Meteorology, and the Functions of Digestion.

9.—THE NINTH Bridgewater Treatise, A Fragment, by CHARLES BABBAGE, Esq.

WORKS ON CHRISTIANITY.

THE BIBLE is the best of all Books;—"It has GOD for its Author, Truth for its Subject, and Salvation for its End."

SEVERAL BIBLES have been published, by different Persons, with very useful and excellent Notes or Expositions, illustrating not only the Christian Doctrines; but also the Manners and Customs of Eastern Nations. These Expositions throw great Light upon many Parts of the Holy Scriptures; and enable us to read them with greater Interest, Pleasure, and ADVANTAGE.

MANY of the early Customs and Manners of the Eastern People, are retained among them, to the present Day; and modern Travellers find continual Proof of the Truth of the Relations given in the Old and New TESTAMENT.

AMONG the Travellers who have recently visited the Site of Babylon, and the Country of the Ancient Chaldeans, We may mention Buckingham, Mignan, Keppel, Porter, Rich, Kinneir, and Keith; and the Names of Pococke, Dallaway, Lindsay, Leake, Arundell, and Hartley, stand prominent among recent Travellers in Palestine and Asia Minor.

THE ACCOUNTS given by all these Gentlemen, tend to prove the complete Fulfilment of many of the Prophecies, in the Old and New Testament, even to the very Letter; and thus showing that the Judgments of Heaven are not *casual*, but *sure*; they are not ARBITRARY, but RIGHTEOUS.

THE REV. WILLIAM BURKITT published a Practical Exposition of the New Testament, which is an exceedingly useful Work; and has gone through numerous Editions.—The Rev. Matthew Henry's Exposition of

the Bible, is a copious Work; and has been much read by all Denominations of Christians.—The Rev. Joseph Benson also published a Bible, with a very Excellent and Practical Exposition.—A very useful Bible was published in 1818, under the Direction of the Society for Promoting Christian Knowledge;—the Notes and Expositions of this Work were prepared and arranged by the Rev. George D'oyly, and the Rev. Richard Mant.—The Rev. Dr. Adam Clarke also published a Bible, with a very Copious, Critical, and Learned Exposition.

The Rev. Dr. Robinson, published, in 1815, a very useful Theological and Biblical Dictionary, greatly illustrating many Parts of the Old and New Testament; and in 1831, The Rev. Richard Watson produced a most valuable Biblical and Theological Dictionary, explanatory of the History, Manners, and Customs of the Jews, and neighbouring Nations; with an Account of the most remarkable Places and Persons mentioned in SACRED SCRIPTURE; and an Exposition of the PRINCIPAL DOCTRINES OF CHRISTIANITY.

MR. WATSON also wrote an Exposition of the Gospels of St. Matthew and St. Mark; with Notes on some other Parts of Sacred Scripture;—Universal Redemption of Mankind, the Doctrine of the New Testament;—Sermons and Sketches of Sermons;—Conversations for the Young, designed to promote the profitable Reading of the Holy Scriptures;—and Theological Institutes, or a View of the Evidences, Doctrines, Morals, and Institutions of Christianity; in Three Volumes Octavo.

THIS WORK forms an Excellent Introduction to the Study of Divinity; and should be CAREFULLY READ by all YOUNG MEN who are *called* to be MINISTERS of the GOSPEL.

THIS BOOK has been much read, by Christians of various Denominations; and is used as a Work of Special Reference, in all the WESLEYAN THEOLOGICAL INSTITUTIONS.

WORKS ON THE EVIDENCES OF CHRISTIANITY.

WE SHALL NOW recommend to our Young Readers, several Excellent Works, on the Evidences of Christianity, the Perusal of which will arm them against the insidious and invidious Attacks of Skeptics and Unbelievers; and will show them the CHRISTIAN RELIGION is founded upon a Rock, that not only defies the *Puny Efforts* of Mistaken Mortals, but against which even the GATES OF HELL SHALL NOT PREVAIL.

MR. ADDISON wrote part of an Excellent Treatise, on the Evidences of the Christian Religion, but did not live to finish it, which is much to be regretted; as what he has left us, is most valuable.—This little Work was greatly improved by the Notes and Illustrations of the Learned Gabriel Seigneux De Correvon; and translated from the Latin, with additional Notes, by the Rev. Dr. PURDY.

BISHOP WATSON's Apology for the Bible, is a Masterly Work; and was written in Reply to Thomas Paine's Age of Reason.—The Bishop completely answers all the Sophistical Attacks of Paine, on the Old and New Testament, and on the Christian Religion; and proves him to be

either ignorant of many Parts of the Scriptures, or wilfully blind to their Real and SCRIPTURAL MEANING.

ARCHDEACON PALEY's Evidences of Christianity, is undoubtedly his Best and his Greatest Work; and cannot be too highly recommended to Youth.—Indeed, any Person that will carefully read this Work, will lay it down with a great Acquisition of Knowledge; and with a full Conviction of the TRUTH OF CHRISTIANITY.

DR. PALEY's HORÆ PAULINÆ, on the Truth of the Scripture History of St. Paul, Evinc'd; is also a Valuable Work, and contains Critical Examinations on all St. Paul's Epistles.—This work should be carefully read by all Young Ministers of the Gospel; as it contains Answers to every Objection that has ever been brought against the Genuineness of these EPISTLES.

HERE WE may likewise mention Lord George Lyttleton's Observations on the Conversion of St. Paul, as a Work of inestimable Value; and which no Deist has ever dared to answer.—We may also observe that his Lordship, in his Youth, had been lead into Skepticism; but mature Research, and Reflection, changed his Principles; and he lived and died a SINCERE CHRISTIAN.

DR. LELAND's VIEW of the Principal Deistical Writers of England of the Seventeenth and Eighteenth Centuries, is an invaluable Production, in the Defence of Christianity.—In this Work, the Doctor Completely overthrow all the Deistical Objections and Arguments of Tindal, Morgan, Dodwell, Hobbs, Blount, Toland, Collins, Chubb, and Woolston; and also those of Edward Lord Herbert, of Cherbury;—Henry Saint-John, Lord Bolingbroke; and Anthony Ashley Cooper, Earl of Shaftesbury.—Dr. Leland's Treatise "On the Advantages and the Necessity of the Christian Revelation," is also a Work of INESTIMABLE VALUE.

BISHOP BUTLER's Analogy of Religion, is an Excellent Work; and ought to be particularly recommended to the Notice of all Young Ministers of the GOSPEL.

THE BISHOP has followed the same method in explaining and elucidating the System of Grace, that Sir Isaac Newton pursued, in unfolding the System of Nature; and has thus founded and completed a happy Alliance between FAITH and PHILOSOPHY.

MR. LESLIE's Short and Easy Method with the Deists; or the Truth of Christianity Demonstrated, has never been answered, and it is UNANSWERABLE.

DR. CONYERS MIDDLETON, feeling how necessary it was, to his Principles, that he should answer Mr. Leslie's Arguments; endeavoured for Twenty Years, without Success, to find Facts and Reasons that would overturn LESLIE's "SHORT AND EASY METHOD WITH THE DEISTS."

DR. DODDRIDGE's Three Sermons, on the Evidences of Christianity, are Admirable Discourses; and are made the Subject of Study and Examination, in one of the two Principal Colleges, in the University of CAMBRIDGE.

DR. WATTS's Three Sermons, upon the Inward Witness to Christianity; Jenyns's Internal Evidence of Christianity; and Andrew Fuller's Gospel its own Witness, are all Excellent Works; and, from the very

Nature of their Titles, they are obviously addressed to CHRISTIAN BELIEVERS.

THE VENERABLE ARCHDEACON WRANGHAM, has published a Valuable Little Work, called "The Pleiad;" containing a Series of Abridgments from Seven Distinguished Writers on the Evidences of Christianity; and which Work forms the Twenty-sixth Volume of Constable's Miscellaneous Publications; but it may be had singly, on Application to any Bookseller, either in the Country, or in LONDON.

IN CONCLUSION, we may recommend, as Excellent Works, Bishop Wilson's Lectures on the Evidences of Christianity; Dr. Chalmers's Evidences of Christianity; and Dr. Olinthus Gregory's Letters on the Evidences, Doctrines, and Duties of the CHRISTIAN RELIGION.

EXTRACTS FROM ARCHDEACON WRANGHAM'S PLEIAD.

"IN ADDITION to such an accumulation of reasoning, if Authority can be deemed necessary, what Names may be adduced more Illustrious than those of

BACON, who affirmed, that "there never was found, in any Age of the World, either Philosopher, or Sect, or Law, or Discipline, which did so highly exalt the Public Good, as the CHRISTIAN FAITH";—of

SELDEN, who pronounced, that "there is no Book upon which we can rest, in a Dying Moment, but the BIBLE";—of

SIR MATTHEW HALE, who pronounced, that "there is no Book like the Bible, for excellent Wisdom, Learning, and Use";—of

MILTON, who asserted, that "there are no Songs comparable to the Songs of Zion, no Orations equal to those of the Prophets, and no Politics like those which the Scriptures teach";—of

THE HONOURABLE ROBERT BOYLE, who declared, that "the Bible is a Matchless Volume, which it is impossible we can study too much, or esteem too highly";—or of

LOCKE, who proclaimed, that "it hath God for its Author, Salvation for its end, and Truth, without any mixture of Error, for its matter";—or of

SIR WILLIAM JONES, who stated, that "he had carefully, and regularly perused the Holy Scriptures; and was of Opinion that the Volume (independently of its Divine Origin,) contains more Sublimity, pure Morality, more important History, and finer Strains of Eloquence, than can be collected from all the Books, in whatever language they may have been written."

"LET THESE, the intrepid Conclusions of our most Illustrious ENGLISH LAYMEN, (to say nothing of NEWTON, who spent much Time in illustrating its Contents,) be contrasted with the frivolous or blasphemous Levities of vulgar Skepticism; and the reader will find no difficulty in choosing between the *Blackness of Darkness*, which the latter offers to his Acceptance, and the Life and Immortality brought to LIGHT BY THE GOSPEL."

WORKS ON DIVINITY.

OUR WORKS on DIVINITY, are very Numerous, and very Excellent; and we may truly affirm, without either Vanity or Boast, that there is no Nation in the World, which pays so much Attention to Morals and Religion, as the **BRITISH NATION**.

WE HAVE, and have had, a Host of Learned Divines and Ministers of the Gospel, whose Works are unparalleled; whether we take into consideration the Learning, the Research, or the Pious Sentiments displayed by their **AUTHORS**.

MEN who have evinced great Erudition, and Mature Judgment, in elucidating and expounding the Holy Scriptures; a fervent Desire to establish Principles of Sound Morality and True Piety; and a sincere Wish to propagate the unadulterated **GOSPEL OF CHRIST**.

MANY OF THEM, indeed, have taken their **LIVES** in their **HANDS**; and have gone forth, to far distant Countries, to disseminate the Christian Religion, among People that were perishing for "**LACK OF KNOWLEDGE**."

THE LIMITS of this Small Work, will not allow us to mention all the Excellent Works that have been written on the Subject of Divinity; but we shall make a Selection of a few of those which have been **READ** and **ADMIRIED** by **CHRISTIANS** of all **DENOMINATIONS**.

THE HOMILIES of the Church of England;—Nelson's Festivals of the Church of England;—Bishop Newton's Dissertations on the Prophecies;—Archbishop Tillotson's Sermons;—Bishop Tomline's Elements of Christian Theology;—Dr. Isaac Barrow's Sermons;—Bishop Butler's Sermons;—Bishop Beveridge's Sermons;—Dr. Samuel Clarke's Sermons, and his Paraphrase of the **GOSPELS**.

BISHOP CONYBEARE'S Sermons;—Bishop Bull's Sermons;—Dr. Gray's Key to the Old Testament;—Keith on the Prophecies;—Sermons on the Prophecies, by Bishop Hallifax;—Bishop Porteus's Sermons;—Bishop Wilson's Sermons;—Bishop Horsley's Sermons;—Dr. Jortin's Sermons;—Dr. Paley's Sermons;—Archdeacon Wrangham's Sermons;—Bishop Bird Sumner's Lectures on the Gospel of St. John;—Dr. Whitby's Treatise on the Five Points;—and the Rev. William Jones's Sermons, and his **CATHOLIC DOCTRINE OF THE TRINITY**.

THE REV. JOHN WESLEY's Sermons;—his Notes on the New Testament;—and his Appeal to Men of Reason and Religion;—Rev. John Fletcher's Checks to Antinomianism; Rev. Theophilus Lessey's Sermons;—Rev. J. Benson's Sermons;—Dr. Adam Clarke's Concise View of the Succession of Sacred Literature,—his Christian Theology,—his Gospels Harmonized,—and his Sermons;—and the Rev. W. P. Burgess's Sermons, designed to illustrate the Doctrines, Experience, and Practice of PRIMITIVE CHRISTIANITY.

THE REV. S. CHARNOCK's Divine Attributes;—Rev. J. Howe's Living Temple;—Dr. John Owen's Exposition of the Hebrew's,—Discourse on the Holy Spirit,—Treatise on Original Sin,—and his Sermons and Tracts;—Rev. John Scott's Christian Life,—and his Sermons;—Dr. W. Bates's Theological Works,—and his Lives of Learned and Pious Men;—Rev. J. Caryl's Commentary on the Book of Job;—Rev. John Flavel's Theological Works;—and the Rev. David Simpson's Plea for RELIGION.

DR. DODDRIDGE's Sermon's,—his Rise and Progress of Religion in the Soul,—and his Family Expositor;—Rev. Richard Baxter's Call to the Unconverted,—and his Saints' Everlasting Rest;—Dr. Watts's Sermons;—Dr. Hugh Blair's Sermons;—Dr. Chalmers's Sermons;—Dr. Dwight's Sermons,—and his System of Theology;—Rev. Robert Hall's Sermons and Tracts;—Rev. Andrew Fuller's Sermons and Expositions;—Burder's Village Sermons;—Beddome's Sermons;—Dr. Wardlaw's Christian Ethics;—Rev. J. H. Hinton's Treatise on the Holy Spirit, and Man's Responsibility;—Dr. Gill's Exposition of the Bible,—and his System of Divinity; Dr. Hunter's Sacred Biography,—and his Sermons;—Rev. J. Watkins's Scripture Biography; and the Rev. J. Robinson's Scripture Characters, or SACRED BIOGRAPHY.

NOTES.

1. JOHN BUNYAN's Works have been often printed; particularly his Famous, Religious, Allegorical Work, entitled "*The Pilgrim's Progress*."—It has also been translated into many different Languages; and has gone through more Editions than any other Work in the English Language, excepting the Bible and Common Prayer Book.

2. DR. JOHNSON greatly commends "*The Pilgrim's Progress*," as a Work of original Genius; and reckons it one of the very few Books which every Reader wishes had been longer.

3. MR. GRANGER expresses the Public Opinion, as well as his own, when he says, "His Master Piece is his '*Pilgrim's Progress*,' one of the most popular, and I will add, one of the most ingenious Books in the English Language."

4. The Rev. A. M. Toplady says, that he "Considers this Work is the finest allegorical Book extant; describing every Stage of a Believer's Experience, from his Conversion to his Glorification.—It is indeed, a Master Piece of Piety and Genius; and will be of standing Use to the People of God, so long as the SUN AND MOON ENDURE."

REMARKS ON RELIGIOUS EDUCATION.

I. IN THE preceding Pages, we have called the Attention of our Readers, to the Mighty and Astonishing Works of the Creation; for independently of the Knowledge obtained by studying and contemplating the Wonders and the Immensity of the Universe, we are of Opinion that no other Subject is so well calculated to inspire Youth with Religious Sentiments, Reverential Awe, and **GODLY FEAR**.

II. WE HAVE also given References to a greater Number of Works on Moral Philosophy, Theology, and Religion, than are to be found in any other Treatise with which we are acquainted; for these Studies do not belong exclusively to Ministers of the Gospel, but are the imperative Duties of every Member of Society; as, upon such Knowledge, depend not only our *Present*, but likewise our **EVERLASTING HAPPINESS**.

“**BODILY EXERCISE** profiteth for a little Time; but Godliness is profitable unto all Things; having the Promise of the Life that now is, and of that which Is to COME.” (*First Tim. Chap. 4th, and 8th, Verse.*)

III. MUCH has been SAID, and much has been WRITTEN, relating to the Religious Education of Children:—We are of Opinion that the Principles of Morality and Christianity should be diligently inculcated in Schools, by the Teachers; but at the same Time, WE DO THINK, after *Mature Deliberation and Reflection*, that this *Momentous Duty*, belongs more to PARENTS and to MINISTERS of the Gospel, than to SCHOOLMASTERS.—The latter are bound to pay the greatest Attention to the General Education and Progressive Improvement of their Pupils; and consequently, they are, in a great measure, precluded from spending much Time, in RELIGIOUS AND DEVOTIONAL EXERCISES.

OBSERVATION.

THE PROFESSIONAL DUTIES of Schoolmasters have been mentioned, at considerable Length, in the former Part of this Essay; and a General Summary of those Duties has been given on the Ninth and Tenth Pages.—We have then adverted to the Duties of Parents and Pupils, as regards the General Education of Youth; and we now wish to recal the Attention of our Readers to those Parts of our Little Work, before we make further Observations on RELIGIOUS EDUCATION.

PARENTS.

IV. PARENTS have a very *Responsible* and *Important* Duty to perform, not only as regards the General Education of their Children; but also as regards their Instructions in the Principles of Duty, Morality, and Religion.—These Obligations are strongly enforced in many Passages of Scripture; a few of which we shall mention, in order to remind Parents of the Duties which they owe to their CHILDREN.

GENESIS, Chapter 18th, and 19th, Verse.—“I know Abraham,” saith God, “that he will command his Children and his Household after him, to keep the Way of the Lord; and to do Justice and JUDGMENT.

DEUTERONOMY, Chapter 6th, and 6th, and 7th, Verses.—“These Words,” saith the Lord, “which I command thee this Day, shall be in thine HEART:—and thou shall teach them diligently unto thy CHILDREN; and shall talk of them, when thou sittest in thine House, and when thou walkest by the Way; and when thou liest down, and when thou RISEST UP.”

PROVERBS, Chapter 22nd, and 6th, Verse.—“Train up a Child, in the Way he should go; and when he is old, he will not depart FROM IT.”

EPHESIANS, Chapter 6th, and 4th, Verse.—“Ye Fathers, provoke not your Children to Wrath; but bring them up in the Nurture and Admonition of the LORD.”

SECOND TIMOTHY, Chapter the 1st, and the 5th, Verse.—“When I call to Remembrance the unfeigned Faith that is in thee, which dwelt first in thy Grandmother Lois, and thy Mother Eunice.”

SECOND TIMOTHY, Chapter the 3rd, and the 15th, Verse.—“From a Child, thou hast known the Holy Scriptures, which are able to make thee wise unto Salvation, through Faith, which is in CHRIST.”

MOTHERS have a *Fine Example* set them, in the Conduct of LOIS and EUNICE, who were not only Pious themselves; but also instructed their Child, in the Knowledge of the Holy Scriptures.—The Rev. John Brewster says, “An early Education, in Sound Religious Principles, is the best Pledge of a PERSEVERING PIETY.”

NOTES.

1. DODSLEY, in his *Economy of Human Life*, says, "A Prudent Mother, informeth the Minds of her Children with Wisdom; and fashioneth their Manners from the Example of her own Goodness.—The Word of her Mouth, is the Law of their Youth; the Motion of her Eye, commandeth OBEDIENCE."

2. EVANS, in his *Essay on Education*, says, "Special Care should be taken, to convince Young People, that the Spirit of True Religion, is a Spirit of Cheerfulness; and enjoins no Man to be Dull.—However misrepresented, by its injudicious Votaries, Pure Christianity aids and invigorates the best Feelings of the Heart. Its Doctrines present us with amiable Views of the Deity; and its Precepts are founded in the strictest Equity. Its Discoveries unfold Prospects beyond this Life, which must be peculiarly acceptable to the CHILDREN OF MEN."

3. ADDISON, remarks, that, "A Source of Cheerfulness to a Good Mind, is its Consideration of that BEING on whom we have our Dependence; and in whom, though we behold him as yet but in the first faint Discoveries of his Perfections, we see every Thing that we can imagine as Great, Amiable, and Glorious. We find ourselves everywhere upheld by his Goodness, and surrounded with an immensity of Love and Mercy.—In short, we depend upon a *Being*, whose Power qualifies him to make us happy, by an infinity of Means; whose Goodness and Truth engage him to make those happy who desire it of him; and whose Unchangeableness will secure us in this Happiness, to all ETERNITY."

4. BURTON, in his *Lectures on Education*, observes, "The Innocence and Simplicity natural to a State of Childhood, are Charms too powerful, not to command our Respect and Esteem; which are, at least, tacit Acknowledgments of our Regard to Moral Beauty. Our Saviour beheld the Temper and Conduct of Children, with so much Complacency, as to lay his hands upon them, and to offer up a Prayer for those that were brought unto him; which when his Disciples would have prevented, he said,—*Suffer Little Children, and forbid them not to come unto me; for of such is the Kingdom of Heaven.*—We may hence infer, from this Circumstance, that Children should be devoted, from their early Years, to a RELIGIOUS EDUCATION."

EXTRACTS FROM THE REV. JOHN ABBOTT'S PRINCIPLES OF MATERNAL DUTY.

"THE EFFORTS which a Mother makes, for the Improvement of her Children, in Knowledge and Virtue, are necessarily retired and unobtrusive.—The World knows not of them; and hence the World has been slow to perceive how powerful and extensive is their secret and silent Influence. But Circumstances are now directing the Eyes of the Community, to the Nursery; and the Truth is daily coming more distinctly before the Public, that the Influence which is exerted upon the Mind, during the first Eight or Ten Years of Existence, in a great Degree guides the Destinies of that Mind, for TIME and for ETERNITY."

"As the Mother is the Guardian and Guide of the early Years of Life; from her comes the most powerful Influence in the Formation of

the Character of Man.—And, why should it not be the Case?—What Impressions can be more strong, and more lasting, than those received upon the Mind, in the freshness and the Susceptibility of Youth?—What Instructor can gain greater Confidence and Respect, than a Mother?—And where can there be Delight in acquiring Knowledge, if not when the Little Flock cluster around a Mother's Knee, to hear of God and HEAVEN?"

"NOTHING can supercede the Necessity of Effort and Instruction, at the Fireside.—The Mother must collect her Little Flock around her; and take upon herself, the Responsibility of their early Religious Education.—The Influence of Sabbath Schools, has undoubtedly awakened more general Interest at Home, in behalf of the Spiritual Welfare of Children; and this Influence has extended itself to Schools IN GENERAL; but even this creates a Danger that some PARENTS may think the Responsibility of Religious Instruction is transferred from themselves to the Masters and Teachers of Seminaries.—This, however, can never be the Case;—HOME should be the Sanctuary of Religious Instruction; —the Mother must be the earnest and affectionate Guide to the Saviour; she must take her Little Ones by the Hand, and lead them in the PATHS OF PIETY."

"NO ONE else can possibly possess the Influence which a Mother may have over her Children; or the Facilities which she enjoys.—She knows their various Dispositions;—their habits of thought;—their moods of Mind;—and thus she can adapt her Instructions to their various Wants and Feelings.—She alone can improve the numerous Occurrences which open the Mind to Instruction; and give it a Susceptibility to Religious Impressions.—She is with them when they are in Sickness or in Pain.—She can take Advantage of the calm of the Morning, and the solemn stillness of the evening.—In the moments of sadness, she can point their minds to Brighter Worlds, and to more satisfactory joys, in the Realms of EVERLASTING HAPPINESS."

"GOD has conferred upon the Mother, Advantages which no one else can possess.—With these Advantages, she has connected Responsibilities, which cannot, by any means, be laid aside, or transferred to ANOTHER.—At Home, and by the PARENTS, the great Duty of Religious Education must be faithfully performed.—The quiet Fireside is the most sacred Sanctuary; maternal Affection is the most eloquent Plead; and obedient Children are the most promising Objects of Religious Impressions.—Let then, Mothers feel this as they ought to feel it; and they will seldom see their Children leave the Paternal Roof, unfortified with Christian Principles, and SINCERE PIETY."

"THERE IS NO ABSOLUTE CERTAINTY that any Procedure will result in the Piety of a Child; but we must steadily and faithfully DO OUR DUTY; and look and pray to GOD for the BLESSING.—If we go on in our attempts to govern and direct our Families without System, or Thought, or Care; we shall undoubtedly reap most bitter Consequences;—but, above all, the Mother must DO HER DUTY."

"SHE must carefully observe the Effects produced by her mode of Discipline and Domestic Management.—There is but little advantage to be derived from Books, unless we revolve their Contents in our Minds. Others may suggest the most valuable Ideas and Plans; but we must

take those Ideas, and dwell upon them; and trace out their Effects, and incorporate them into our Minds, by associating them with others of our own, and with our own daily Experience.—In fact, we must accustom ourselves to Observation, Investigation, Consideration, and Reflection.”

“THE MOTHER, who will do this, will most certainly grow in Wisdom.—She will daily perceive that she is acquiring more Facility in forming, in her own Children, the Character she desires; and the increasing Obedience and Affection she will receive, will be her constant Reward.—It is true, that great Care and Labour are necessary, in training up a Family in the *right* and *perfect* Way; but no other Cares are rewarded with so Rich a Recompense.—No other Labours insure such a permanent and rational ENJOYMENT.”

“YOU, OH MOTHERS!—always remember that you have IMMORTAL SOULS entrusted to your Care and Keeping.—Their Destiny, is in a great Degree, put into your Hands.—Your Ignorance or Unfaithfulness, may sink them in Eternal Misery.—Your Knowledge and Fidelity may elevate them to Mansions of Happiness.—You and your Children may soon be ranging, with Celestial Wings, the Realms of Blessed Saints; if HERE, you are faithful in Prayer and Effort, to train them up for HEAVEN.”

EXTRACTS FROM HORT'S ADVICE TO PARENTS AND TUTORS.

“THE IDEA of a Supreme Intelligence, the Creator and Preserver of all Things; the Disposer of all Events; the ever present Moral Governor and Judge of all accountable Beings; the constant Inspector of every Heart,—is the Foundation of all Right Feeling, and Good Action.—Let this Idea, then, be given to Children, as soon as their tender Minds can admit it;—let it be arrayed in the most attractive Colours;—let it be surrounded by a Crowd of Pleasing ASSOCIATIONS.”

“THE HUMAN MIND is capable of receiving Ideas of a Great, Good, Merciful, and Almighty Creator, much sooner than some Writers have been willing to admit; and the sooner these Truths are impressed upon the Minds of Children, the better; in Order that the most important of all Ideas, may early take Root in the Mind; and grow with its Growth, and strengthen with its Strength.”

“WITH the Ideas of Great and Almighty, Parents should take Care to unite those of Wisdom, Goodness, Kindness, &c. &c.; because, to associate these Ideas in the Minds of Children, is of the utmost Moment.—This will habituate them to regard God as their Protector; their best Friend and Benefactor; and will thus gradually and naturally introduce Love for Him, Trust in Him, Desire of pleasing and serving Him, into the Mind and Soul; and establish them there, as perpetual Inmates.—And, blessed and blessing Inmates they will prove;—enlightening, purifying, cheering, invigorating the Mind; steering steadily through Life; sustaining in the Hour of Death; and conducting safely, to a new and more exalted STATE OF EXISTENCE.”

“LET PARENTS take Heed that they do not deprive their Children of this most precious Blessing, by introducing the Idea of God into their tender Minds, in such a Manner as to produce Associations of Terror

and Aversion, instead of Confidence and Love.—By some pious, but ill-judging Parents, the Idea of the Deity is introduced to the Imagination of their Children, accompanied by exactly similar Impressions to those which have often been conjured up by the Name of some terrific, imaginary Being.—Their kind heavenly Father, is made to appear to them in the Light of an invisible but avenging Tyrant, whose Service is perfect Bondage.—That hatred of Sin which springs from the Perfection of the moral Attributes of the Deity, is prematurely presented to their Minds, at a Period when they are yet incapable of perceiving and comprehending the Force of ABSTRACT TRUTH."

"THE IMPRESSION that is, by this Means, made upon their Senses, is, however, sufficiently deep to remain permanent. The associations thus produced must surely be those of Aversion.—Would good people permit their zeal to be under the Dominion of their Judgment; would they pay some Attention to the progress of Minds, and observe the slow and gradual progress of Nature, in the development of Faculties,—they would not idly attempt to explain to Children, subjects of abstract Speculation, at a period when, at best, it can have no other Effect, than to leave upon their Minds impressions of Weariness and Wonder."

"IF PARENTS, therefore, wish that the celestial Plants of Piety and Religion should be rooted in the Hearts of their Children, let them be careful to give them, early in life, the Idea of a Supreme Lord of All; and to let that Idea be connected with the most pleasing Associations. Let the Idea of Almighty Power be united with those of Infinite Knowledge, Wisdom, Benevolence, Bounty and Mercy.—If God and Religion be presented to the Infant Mind, as surrounded with Gloom, as clothed in Severity, as dressed in Frowns, as tremendously awful and threatening; such Representations will, assuredly, awaken Terror and Aversion, not Confidence and Love; and most probably will end in not only breaking such a heavy yoke of Bondage, but also in completely throwing off the CURB OF RESTRAINT."

"How readily will they, to whom in the days of Infancy, Religion was rendered an Oppressive Burden, when they attain to the season of Youth, listen to the song of the siren Pleasure, to the ensnaring sophistry of Infidelity.—They will probably disengage themselves from the beneficial Influences of true Religion; while they may still remain under the Tyranny of slavish Fear, and superstitious DREAD."

"LET US be solicitous to connect in the Minds of our Children, *individually* to connect, the Ideas of God, Religion, and Virtue, with those of Enjoyment and Happiness; and the Idea of Vice with that of Misery.—Let us take Care that their first Impressions concerning those most momentous Objects, be Cheerful, Agreeable, Encouraging.—Then, will there be every reason to hope that those Principles of true Wisdom will be so deeply planted in their Hearts, as to stand Firm against the Attempts of Skepticism, the Temptations of Prosperity, the Trials of ADVERSITY."

"LET, then, the Idea of God, the bestower of Good, be intermingled with all the Pleasures, the Comforts, the Enjoyments of Children; and with every thing which affords them Delight.—Let them be taught thus to feel and reason:—Our Parents and Friends provide for us food and clothing, and habitation, and amusements, and give us Knowledge, and

Instruction ; but it is God who enables them to do so, and therefore, God who, in fact, affords us all those good THINGS."

"THESE IDEAS of the Divine Being, may be communicated more easily, and far more impressively, from the lips of Parents, sedulously embrace every opportunity of conveying them, which arise in their daily intercourse with their Children, than by Lessons and Catechisms ; in learning which they too often learn words, and the labour of committing which to Memory, hazards excitement of disgust, and sentiments unfavourable to the Formation of the RELIGIOUS FRAME AND TEMPER."

"CHILDREN may gently, gradually, and pleasingly, be led to the Nature, up to Nature's God.—Every object of the Creation, especially the more Grand and Beautiful Objects, which raise delight and admiration, may be made subservient to this purpose. The Power, the Goodness of God, may be pointed out, as apparent on all Sides, and pleasurable Ideas may naturally be united with those Displays."

"If the Divine Being be thus represented to the Infant Mind, may his Omnipresence be made a source of Joy, of Trust, of Confidence ; as well as of Reverence, Awe, Self-command, Obedience, Regard for Sincerity. The Idea of the constant Presence of a Being who loveth Truth, Peace, Kindness, and Purity, should be early deeply infix'd in the Heart, as it will, probably, prove the powerful Friend and Supporter of Virtue in AFTER-LIFE."

"THE IDEA of the constant Presence of God, as a Benefactor, Father, a Protector, ever ready to Hear and Bless, those who love him, and uniformly Obey him, should be indelibly impressed on the Soul ; as it will prove an unfailing source of Consolation, Strength and Fortitude,—a preservative against all groundless Terror Alarms."

"As the intellectual Faculties expand and strengthen, the Attributes of the Eternal may be unfolded to their View ;—his Justice, his Holiness, his Mercy, his unfailing Loving-Kindness, as being exercised in his Government of the World, the providential Care which He extends to all CREATURES."

"THE pleasing Association supposed to be previously formed in the Youthful Mind, will facilitate the admission of these Ideas ; and render them Acceptable. Hence we may proceed to conduct our Children to the Sublime Truths of revealed Religion : the Rational, Grand and Delightful Representations it gives of the Almighty ; the paternal Character which it assigns Him in conjunction with that of Creator, of Governor, of Ruler, and of Judge ; the present State of Man as his inferior Being : the Certainty of Another very different and far more exalted

Scholastic Terms, and all incomprehensible Articles of Belief, however we may ourselves, venerate and respect them."

"A KNOWLEDGE of the Scriptures, I look upon as a very essential part of Religious Education; but to render this Knowledge useful, it is not sufficient that their Contents be impressed upon the Memory; the Lessons they contain must be made to reach the HEART."

"WHERE the Knowledge of Scripture is forced upon Children as a Task, where they are compelled to recite long portions of it from Memory, in the same Manner as they decline Nouns, and conjugate Verbs; the Passages learnt may be retained by the Memory, but we may reasonably *Doubt* whether they will ever impress the HEART."

"THE first Step towards inspiring your Children with a Veneration for the Sacred Writings, and with a Desire of knowing something of their Contents, must be the Observations they will naturally and voluntarily make upon your own frequent Perusal of them."

"WHILE they see other Books read and dismissed, and the Bible alone remaining the constant Companion of your serious Hours, the Subject of your daily and delightful Meditation;—they will associate the Idea of superior Excellence with the Bible, before they are able to read that BLESSED BOOK."

"BUT, on the contrary, if they see it only brought out upon a *tedious* and *gloomy* Sunday, and then read merely as a Duty and a Task; the Prepossession that will take Place in disfavour of its Contents, will probably never be eradicated from their MINDS."

"THE COUNSELS of Religion must be used like Nourishment, not like a single Medicine, and upon the actual pressure of a present Necessity. —Indeed, Instructions to Children, upon Religious Subjects, should be administered, as daily Bread, in such Portions as the Appetite calls for, and Nature can digest; and not as a Nauseous Medicine, which Children must be forced to take, for the GOOD OF THEIR SOULS."

"LET our first Endeavour be, to create, and to fix in the Minds and Hearts of our Children, the LOVE OF GOD; as being the purest, the best founded, the most ennobling Love; the most abundant Source of true Felicity, and the surest Preservative from Evil.—The Implantation of this Vital Root, perpetuates virtuous Practice; secures internal Peace; and will, through the Merits of Christ, lead us to ETERNAL HAPPINESS."

NOTES.

1. WE HOPE the Observations we have made on the Duties of Parents; the Extracts we have given from the Scriptures; and the Instructions and Admonitions we have taken from other Excellent and Valuable Works, will be duly appreciated by both Parents and Teachers; and will be the means of proving a Benefit and a Blessing to the RISING GENERATION.

2. WHEN CHILDREN receive the Chief Part of their Education at Boarding Schools, then a Great Portion of the Responsibility which naturally belongs to Parents, as regards Religious Instruction, is transferred to the Master and his Assistants; and they ought to be extremely careful that they perform their Duty, with Diligence, Prudence, and PROPRIETY.

MINISTERS.

V. **MINISTERS** of the Gospel have also Great and Responsible Duties to perform; for they have been CALLED to minister in Holy Things, and to preach the Glad Tidings of Everlasting Salvation to the Children of **MEN**.—But, besides the Public Duties of the Pulpit, it is expected that they pay particular Attention to the Children of their respective Congregations; and often call them together, and give them such Religious Instruction as their Young and Tender Years enable them to receive and COMPREHEND.

WE KNOW this is the General Practice of many Good and Pious Ministers; and their Labours are not in vain, in the Lord; for Religious Instruction always comes with peculiar Power and Grace, from a Minister, and is usually attended with a Blessing on his YOUTHFUL CHARGE.

MANY CLERGYMEN, and Ministers of the Gospel, are in the Habit of preaching occasional Sermons, particularly adapted for the Improvement and Edification of the Younger Part of their Congregations; and this is a praiseworthy and an excellent Practice;—besides it gives a favourable Opportunity for reminding PARENTS of the Duties which they owe to their CHILDREN.

THIS was the Practice of the Rev. Archdeacon Wrangham, of Hunmanby, near Scarborough; the Rev. John Dixon, Vicar of Hedon, near Hull; the Rev. Nussey Holmes, Incumbent of Farnley, near Leeds; and of many other Clergymen, and Ministers of the Gospel, whom we could mention.

ON these Occasions, we always observed that the Places of Worship were better attended than usual; and this was a sufficient Proof that such Sermons were well received by both PARENTS and CHILDREN.

WE may also mention the Addresses and Sermons published for the Instruction and Edification of Children and Young Persons, by the Rev. Isaac Taylor, the Rev. William Enfield, the Rev. Dr. Blair, the Rev. Dr. Paley, the Rev. Dr. Trapp;—and also by Bishop Gibson, Bishop Home, Bishop Secker, Bishop Porteus, &c. &c.

CHRIST, the Head of the Church, has left Us ALL, not only a Command, but an Example;—the following Passages of Scripture, will call to our Minds, in what high Estimation he held LITTLE CHILDREN.

MATTHEW, Chapter the 21st, and the 15th, and 16th, Verses.—“And when the Chief Priests and Scribes saw the wonderful Things that he did, and the Children crying in the Temple, and saying, *HOSANNA* to the Son of David; they were sore displeased, and said unto him, Hearst thou what these say?—And JESUS saith unto them, Yea; have you never read, Out of the Mouth of Babes and Sucklings, thou hast perfected Praise?—(See *Psalm 8th, and 2nd, Verse.*)

BISHOP HORNE, remarks on this Passage,—“The Proposition arising from the Text, is evidently this; that God is pleased to esteem himself honoured, when Children are taught to confess and to praise his Holy Name; and he is still further honoured, when Children are taught to confess and proclaim his Truths; because, hereby it is shown, that his Truths are such as Children may confess and proclaim.—In this Way, he delights to show forth his Glory, through the WHOLE CREATION.

NOTES.

1. THE REV. DR. ROBINSON, says, “*HOSANNA*, is a Hebrew Word, which signifies, *SAVE, I RESEECH YOU.*—It is also a form of blessing, or wishing well.—At our Saviour’s Entrance into Jerusalem, when the People cried, *HOSANNA*, their Meaning was, *Lord, preserve this Son of David; heap Favours and Blessings on Him.*” (See *John, Chapter the 12th, and the 13th, Verse.*)

2. THE REV. RICHARD WATSON, says, “*HOSANNA*, means, *SAVE, I RESEECH THEE; or, Give Salvation.*—It is also a well known Form of blessing.” (See *Mark, Chapter 11th, and the 9th, and 10th, Verses.*)

SIMILAR Explanations of the Word *Hosanna*, are also given by DR. WHITBY.

MARK, Chapter the 10th, and the 13th, 14th, and 15th, Verses.—“And they brought Young Children to him, that he should touch them; and his Disciples rebuked those that brought them. But when Jesus saw it, he was much displeased, and said unto them, Suffer Little Children to come unto me, and forbid them not; for of such is the Kingdom of Heaven. Verily I say unto you, if any man shall not receive the Kingdom of God, as a Little Child, he shall not enter therein. And he took them up in his Arms, put his Hands upon them, and BLESSED THEM.”

BISHOP HORNE, in his Remarks on this Passage, says, “Children, then, are capable of Benefit by Christ; they are capable of his Blessing on Earth, and his Presence in Heaven; Subjects of his Kingdom under Grace, and Heirs of his Kingdom of Glory. The best Office, therefore, we can perform for them, is to be the Means of bringing them to the Knowledge of him; that they may be partakers of these Benefits, and glorify their Father which is in Heaven.—He is pleased when we are

thus employed.—Nay, he sets these Children before us, as Little Patterns and Models of what we ought to be ourselves, in Heart, Mind, and CHRISTIAN SIMPLICITY."

THE REV. ISAAC TAYLOR, in a commentary upon this Passage, says, "Blessed be God;—the Mercies of the Gospel, the Blessings of Salvation, though large enough to satisfy the utmost Powers of a Man; are yet not beyond the Capacity of a Child to possess and to enjoy.—That Glorious Redeemer, who calls all Men to repent, and who promises Grace, Mercy and Pardon to Penitents;—who says, he will give Everlasting Life and Glory to every Man who seeks it;—has also said of Little Children, Suffer them to come to me, for of such is the KINGDOM OF HEAVEN."

CHILDREN.

VI. CHILDREN, as well as Teachers, Parents, and Ministers of the Gospel, have many Great and Important Duties to perform; and these Duties are clearly laid down, and strenuously insisted upon, in the HOLY SCRIPTURES.

WE shall place a few of these Duties, before our Young Readers, in Order that they may properly know them, and hence be Inexcusable; for the Care, Advice, Instructions, and Admonitions of their Teachers, Parents, and Friends, will be of little Avail, if they will not regard the Voice of the Scriptures; nor hearken to the Precepts of Experience, Prudence, and WISDOM.

EXODUS, Chapter the Twentieth, and the Twelfth Verse.—"Honour thy Father and thy Mother, that thy Days may be long upon the Land, which the Lord thy God giveth thee."—(*This is the Fifth Commandment; and the First with Promise.*)

BISHOP HOPKINS, in commenting upon this Commandment, says, "Reverence to Parents consists in having a respectful Love for, and an awful Fear to offend them; not such a fear as terrifies, for that is slavish and tormenting; but an obliging Fear, that will create Esteem and Veneration, that will engage us to observe their Commands, and to refrain from whatever is displeasing to them."

"THIS REVERENCE should be expressed in our Words and Actions. Our Expressions must be full of Respect and Honour, giving them such Titles as their Quality and Condition require; and our Words, in answering them, should be few, humble, and submissive. It is but reasonable that we should give them the most obliging Language, who first taught and instructed us to speak."

"WE must also reverence them with a decent, modest, and respectful bodily Behaviour; showing all external Signs of Honour. Joseph, though highly exalted in the Court of Pharaoh, when he brought his Sons to receive the Blessing of Jacob his Father, bowed himself to the

Ground.—But as we must honour them with Reverence, so must we with Obedience; without which all external Respect is mere Formality.—‘Children, obey your Parents in all things; for that is well-pleasing unto the Lord.’—(*Col. Chap. 3rd, and 20th, Verse.*)

“IF WE seriously consider that we owe to our Parents, our Lives, Education, and many other Benefits and Blessings; we should never think any Thing too much to do for them.—Oh! the Cares, anxious Thoughts, and perplexing Fears, which our Parents have continually had for our Welfare!—And, can we so return their Love and tenderness, as to despise their Persons, or become stubborn and DISOBEDIENT?”

“ALL sour, morose, and unseemly Looks towards a Parent, are threatened to be severely punished. ‘The Eye that mocketh at his Father, and despiseth to obey his Mother; the Ravens of the Valley shall peck it out, and the Young Eagles shall EAT It.’—(*Prov. Chap. 30th, and the 17th, Verse.*)

NOTE.—BISHOP PATRICK, says, “That Children who are disobedient to their Parents, and who will not attend to their Counsel, nor hearken to their Advice, often come to untimely and premature Deaths; and their Bodies are frequently exposed, and become a Prey to Ravens and EAGLES.”

LEVITICUS, Chapter the Nineteenth, and the Third Verse.—“Ye shall fear every Man his Mother, and his Father, and keep my Sabbaths:—I am the Lord your God.”

BY A LAW OF SOLON, the great Legislator of the Athenians, it was enacted that, whoever did not make Provision for his Parents, should be treated with Infamy and DETESTATION.

MARSHAM observes, “That the Mother is here put before the Father, as, in Exodus, the Father was put before the Mother; in Order to signify that Obedience and Reverence, in general, are due alike to both Parents.”—The Rev. H. Crossman, says, “It is the Duty of Children, to honour their Parents, by loving and fearing them;—by paying them every possible Respect;—by being obedient to all their lawful Commands;—and by relieving them in their Wants and Necessities.”

IN what Manner we are to keep the Sabbaths of the Lord, may be seen in the 20th, Chapter of Exodus, from the 8th, to the end of the 11th, Verse.—These four Verses contain the FOURTH COMMANDMENT.

DEUTERONOMY, Chapter the Twenty-seventh, and the Sixteenth Verse.—“Cursed be he that setteth Light by his Father or his Mother.—And, all the People shall say AMEN.”

NOTE.—THE Word AMEN, has various Meanings, in Scripture;—sometimes it signifies, *True, Faithful, Certain*;—sometimes, *Verily, Verily*;—and frequently, it is understood, as expressing a Wish, as “Amen! So be it!”—This is its Meaning in the last Quotation.

PROVERBS, Chapter the Sixth, and the 20th, 21st, 22nd, and 23rd, Verses.—“My Son, keep thy Father’s Command-

ment, and forsake not the Law of thy Mother:—Bind them continually upon thine Heart, and tie them about thy Neck. —When thou goest, it shall lead thee; when thou sleepest, it shall keep thee; and when thou awakest, it shall talk with thee.—For the Commandment is a Lamp; and the Law is Light; and Reproofs of Instruction, are the WAY OF LIFE."

PROVERBS, Chapter the Tenth, and the First Verse.—
"A wise Son maketh a glad Father; but a foolish Son, is the Heaviness of his Mother."

PROVERBS, Chapter the Nineteenth, and Twenty-sixth Verse.—"He that wasteth his Father, and chaseth away his Mother, is a Son that causeth Shame, and bringeth Reproach."

LUKE, Chapter the Second, and the Fifty-first Verse.—
"And he went down with them, and came to Nazareth, and was subject to them"

DEAN STANHOPE, says, "What a Pattern has our SAVIOUR set in this, to all Children, of Humility, and Submission and Reverence to Parents!! How indispensable does it represent the Dutifulness of Children in general;—how inexcusable their Stubbornness and Disobedience, when He who was God, as well as Man, thought it became Him, to submit to parental Government; and in all His Deportment, was full of Respect to his Parents.—Most wisely did the Inspired Writer insert this Passage in the History of our Meek Redeemer's Life; as a singular Ornament and Grace to it; an early but remarkable Instance of His marvellous Condescension; and such a Motive to profound Reverence and humble Duty to Parents, as no laboured Arguments can SUPPLY."

ECCLESIASTES, Chapter the Twelfth, and the First Verse.—
"Remember now thy Creator, in the Days of thy YOUTH."

ARCHBISHOP TILLOTSON, says, "We are to 'Remember our Creator, in the Days of our Youth,' by honouring, fearing, loving, obeying, and serving Him;—in a Word, by acting as becomes those who are mindful of God, and who bear Him continually in their THOUGHTS."

YOUTH, is undoubtedly the most proper Time to commence a Religious Life, as appears manifest by our Saviour's Approval of the Praises offered to him, by Little Children;—by his taking them up in his Arms, and blessing them;—and by his asserting, that "Of such is the Kingdom of HEAVEN."

BESIDES this, we must remember that Christ has said, "Take heed that ye despise not one of these Little Ones; for I say unto you, that in Heaven, their Angels do always behold the Face of my Father, which is in HEAVEN."—(*Matt. Chap. 18th, and 10th, Verse.*)

YOUNG PERSONS should always remember, that Youth is no Security against Death.—Oh! how many of our Dear Young Relatives and Friends, have been cut down in the very Dawn or Prime of Life, like Flowers of the Field, that budded, blossomed, and flourished but for a very Little Season; and were then called hence to be seen no more in this World, till the Resurrection of the Just.

BUT it is not the Young only that are called upon to "Remember their Creator;"—it is the Imperative Duty of every Person to fear, love, honour, serve, and worship God, through his Son JESUS CHRIST, who is our Mediator, and Redeemer;—and the sooner this important Duty is commenced, the better; knowing well, that HERE we have no abiding City; and that after Death, we shall be called upon to give an Account of the Deeds done in the Body, whether they be GOOD, or whether they be EVIL.—Oh! that we may all be wise unto Salvation; and seek and secure Mansions not made with Hands, but Eternal in the HEAVENS!!!

EXTRACTS FROM A SERMON, ON THE PRECEDING TEXT,
BY DR. TRAPP.

"MEN should accustom themselves to the Service of God early, in their Youthful Days; and not defer it till Old Age overtakes them; because, if they do, it is very likely they may defer it till Death overtakes them likewise."

"EARLY PIETY, is of the first Importance; and Young Persons should be frequently reminded of this great Truth by others; and should frequently and seriously consider it themselves:—'Remember now thy Creator in the Days of thy Youth.'"

"RELIGION is our Duty, in every Scene and Stage of Life; and, consequently, in our Youth;—particularly, as it regards both our present and future Happiness.—God has a right to our Service from the first moment of our having any considerable Use of our Reason, to the Last moment of our Lives. Yet Young Persons are apt to flatter themselves, that because they are young, they have, for that very Reason, a kind of Dispensation to be foolish and vicious; and that it is Time enough to be wise and good, when they are older; but this is a great Mistake.—The first Fruits of our Lives, and the Flower of our Age, are most acceptable to God."

"AND, are we not obliged to present the best we have to him, who has

given us all that we have ; and who is himself the best, the greatest, and the most glorious of Beings? Can those who flourish in the Spring of their Years, think they are nothing indebted to their Creator and Preserver, for their youthful Health, Vigour, Spirit, and Beauty?"

EXTRACTS FROM EVANS'S APPEAL TO YOUNG PEOPLE ON THE SUBJECT OF RELIGION.

"THE CHRISTIAN RELIGION, comes recommended to you, by a Number of weighty Considerations.—It is not an irrational Jargon, fabricated by artful Men, to frighten the timid and credulous, into the Practice of Virtue.—It is neither the Offspring of Enthusiasm, nor the Child of Superstition.—God has presented Man, with a well-authenticated Volume, containing Facts illustrative of his Moral Character; promulgating Doctrines honourable to the Divine Perfection; and enjoining Duties practicable in themselves, and subservient to your real FELICITY."

"ATTEND, therefore, to these Facts, Doctrines, and Duties, before your Understandings are clouded by the Prejudices of more advanced Years.—Education, Example, and Authority, warp the best Minds; and prevent an Examination of the Sacred Writings. Thus circumstanced, to what innumerable Errors, even on the most important Subjects are you exposed!"

"YOUR HEAVENLY FATHER has made you a Present of THE BIBLE, designing that you should study its Evidences, understand its Contents, and live under the Influence of the Knowledge there communicated.—Acquaint yourselves, therefore, at an early Age, with THE SCRIPTURES, that you may, know the unadulterated Will of your Creator, respecting his sinful Creatures."

"FROM the inspired Writings, you will derive a just Knowledge of the Divine Attributes, of the fallen Condition of human Nature, of its Restoration by Jesus Christ; and of the Prospects offered us, in a future World, where the Dispensations of Heaven shall receive their full Consummation!—These are the glorious Subjects presented to your Attention in the HOLY SCRIPTURES."

"TIMOTHY, from a Child, knew the Holy Scriptures, which are able to make us wise unto Salvation.—Dim was the *lesser* Light of Reason, which ruled the Night of the heathen World, compared with the *greater* Light of Revelation, which arose to rule the Day of CHRISTIANITY."

ADVANTAGES OF EARLY RELIGION, BY DR. WATTS.

HAPPY the child, whose youngest years,
Receive instruction well;
Who hates the sinner's path, and fears
The road that leads to hell.

When we devote our youth to God,
'Tis pleasing in his eyes;
A flower, when offer'd in the bud,
Is no mean sacrifice.

'Tis easier work, if we begin
To fear the Lord betimes;
While sinners that grow old in sin
Are harden'd in their crimes

'Twill save us from a thousand snares,
To mind religion young;
Grace will preserve our following years,
And make our virtues strong.

To thee, Almighty God, to thee,
Our childhood we resign;
'Twill please us to look back, and see
That our whole lives were thine.

Let the sweet work of pray'r and praise
Employ my youngest breath;
Thus I'm prepared for longer days,
Or fit for early death.

WORKS ON RELIGIOUS EDUCATION.

PROSE WORKS.

THE BIBLE, as we have before observed, is the Best of all Books; and every Work that is written on the Subject of Christianity, must have its Foundation, in the Bible, or it will only be as sounding Brass, or as a tinkling Cymbal.

BUT for the Bible, what should we have known of the Attributes of the Almighty:—of his Omnipotence, his Omnipresence, his Omniscience, his Mercy, his Goodness, his Justice, &c. &c.?

BUT for the Bible, what should we have known of the Creation of the world;—of the Fall of Man;—of his Redemption, by Jesus Christ;—of the Gift, Offices, and Operations of the Holy Spirit;—of the Resurrection of the Dead;—of the Immortality of the Soul;—of the final Judgment;—or of future Rewards and Punishments, after DEATH!

AND, there can be no doubt, that Socrates, Plato, Cicero, and other Heathen Philosophers, obtained their imperfect and confused Ideas of the Supreme Being, and of the Immortality of the Soul, from Traditions derived and handed down, from the BIBLE.

EXCELLENCY OF THE BIBLE, BY DR. WATTS.

GREAT GOD, with wonder and with praise,
On all thy works I look;
But still thy wisdom, pow'r, and grace,
Shine brightest in thy book.

The stars that in their courses roll,
Have much instruction giv'n;
But thy good word informs my soul,
How I may climb to heav'n.

The fields provide me food, and show
The goodness of the Lord;
But fruits of life and glory grow
In thy most holy word.

Here are my choicest treasures hid,
Here my best comfort lies;
Here my desires are satisfied,
And hence my hopes arise.

Lord, make me understand thy law,
Shew what my faults have been;
And from the gospel let me draw
Pardon for all my sin.

Here would I learn how Christ has died,
To save my soul from hell;
Not all the books on earth beside,
Such heavenly wonders tell.

Then, let me love my bible more,
And take a fresh delight,
By day, to read those wonders o'er,
And meditate by night.

WE HAVE, already referred to many Excellent Works on Religion; but there are some which are peculiarly adapted for the Improvement and Edification of Children and Young Persons; and which have been written by Men of Extensive Knowledge and Experience, and Great and Genuine Piety.

THE REV. S. BARROW's School Sermons, is an Excellent Work; and is not only adapted for the Use of Schools in general; but is well calculated for the Devotional Exercises, and the Edification of Young Persons in Private Families.

THIS WORK contains Fifty-six Sermons; namely, One for every Sunday in the Year, and One for Good Friday, Easter Sunday, Whit Sunday, and Christmas Day; and which have been selected from the Works of Blair, Gisborne, Paley, Jorton, Enfield, Horne, Porteus, Sherlock, Secker, Beveridge, and nearly Twenty other Divines and Ministers of the GOSPEL.

THE REV. ISAAC TAYLOR's Twelve Addresses, on Moral and Religious Subjects, delivered to Young Persons, at School, is also a valuable Work; and should be in the Hand of every Teacher of an Academy, and of every Master of a Family; as its Contents are fraught with valuable Instructions and Admonitions to YOUTH.

THE following Works are likewise well adapted for the Moral and Religious Improvement of Young Persons; and have been composed and published expressly for that Purpose:—DR. SPRING's Obligations of the World, for the Bible;—Persuasives to Early Piety, by J. G. Pike;—The Testimony of Scriptures on the Subject of Prayer, by Lucy Barton;—Practical Piety, by Hannah More;—Familiar Illustrations of the Principal Evidences and Design of Christianity, by Maria Haack;—An Explanation of the Principal Parables, by Mrs. Matheson;—Dr. Samuel Clark's Scripture Promises, by Rev. David M'Nicoll;—Guide for Young Disciples, by J. G. Pike;—The Young Christian, by Jacob Abbott; and Bishop Beveridge's Private Thoughts, upon RELIGION.

MRS. TRIMMER's Lessons on the Old and New Testament;—The Mother at Home,—and the Child at Home, by Rev. J. S. C. Abbott;—W. F. Lloyd's Bible Catechism,—and its Abridgment;—The Catechism of the Church of England;—Irving's Catechism of Sacred History, by Rev. T. Clark;—An Introduction to the Christian Religion, by Rev. H. Crossman;—Hours of Thought, by Annett;—A Short History of the Old and New Testament, by Harvey and Darton;—Adam's Private Thoughts on Religion;—Alexander's Evidences of Christianity;—J. Alleine's Alarm to the Unconverted;—R. Alleine's Heaven Opened;—Bogue's Divine Authority of the New Testament;—and Albadie's Deity of Christ, essential to the CHRISTIAN RELIGION.

BOLTON's Four Last Things—Death, Judgment, Heaven, and Hell;—Asty's Rejoicing in the Lord Jesus;—Barnes's Notes on the Gospels;—Barth's History of the Church of Christ,—and his General History, on Scripture Principles;—Bates's Spiritual Perfection;—Baxter's Dying Thoughts;—Berridge's Christian World Unmasked;—Bishop Beveridge's Select Sermons;—Binning on Fellowship with God;—Blossoms and Fruit, Or Christians Eminent for Early Piety;—Bogatzky's Golden Treasure, for the Children of God;—Dr. Burder's Pleasures of Religion,—and his Way of Salvation;—Murray's Power of Religion on the Mind; The Catechisms of the Wesleyan Methodists, compiled by the Rev. Richard Watson,—and his Conversations for the Young, designed to promote the profitable Reading of the HOLY SCRIPTURES.

NOTE.—THE RELIGIOUS Tract Society, has published many very Excellent Books, for the Improvement of Young People, particularly on Moral and Religious Subjects; and which may be obtained, at very moderate Prices, of John Davis, 56, Paternoster Row;—of J. Nisbet and Co., 21, Berners Street, Oxford Street, London; and all other BOOKSELLERS.

POETICAL WORKS.

MANY PIOUS and Ingenious Persons, have very laudably, devoted their Time and their Talents, to the Composition of Little Poems and Hymns, adapted for the Improvement of Children and Young Persons, in Morality and Religion; and in their General Knowledge of the Beauties of Nature, and of the Works of Creation:—We present the following Selection of Juvenile Poetry, to the Notice of our Young Readers, as well deserving their early and particular ATTENTION.

LEAVES OF POETRY, by Sarah Frankland;—Childhood Illustrated, in a Selection from the Poets, by H. M. R.;—Poetical Gleanings, from Modern Writers, by a Governess;—Poems for Young Children, by a Lady;—Simple Hymns for Young Children, chiefly Original;—Original Poems, for Infant Minds, by several Young Persons;—Rhymes for the Nursery, by the Authors of Original Poems;—and The Bee, a Selection of Poetry, from approved Authors.—All these pleasing and valuable little Works, are published by Harvey and Darton, Gracechurch Street.

THE DIADEM, a Selection of Poetry, Chiefly Modern;—Songs for Heaven, a Selection of Devotional Poetry;—The Sacred Harp, First Series;—The Evergreen, a Selection of Preceptive and Religious Poetry;—The Perennial, a Selection of Moral and Religious Poetry;—The Heart's Ease, by the Editor of the Diadem; Verses for a Christian Child;—and Remember-Me, being Original Poems, by the most popular Authors of the present Day.—These useful and beautiful Poetical Works are all published by Darton and Clark, Holborn Hill.

THE POETICAL PIECE BOOK, for the Use of Schools;—Hymns for Infants Minds, by the Authors of Original Poems;—Innocent Poetry for Infant Minds, by Mary Elliott,—and her Simple Truths in Verse. The Honeysuckle.—Or Poetical Sweets;—The Poetical Forget-Me-Not;—Bishop Ken's Poems;—The Sacred Harp, Second Series;—and last, but not least, Dr. Isaac Watts's Divine and Moral Songs, for the Use of Children.—This Heavenly Little Work, has been approved by all Societies, Parties, and Denominations of CHRISTIANS.

NOTE.—HERE we may observe, that Messrs. Harvey and Darton; and Messrs. Darton and Clark, are entitled to much Praise, for the great Number of Books they have published, that are so well adapted for the Improvement of Children and Young Persons, in Moral, Religious, and General KNOWLEDGE.

REMARKS.

WE HAVE, in the preceding Pages, pointed out a few of the Moral and Religious Duties of Children;—Duties which, as Members of Society, they owe to the Public;—and as accountable Creatures, they owe to themselves, and to their Creator.

WE HAVE furnished them with the Titles of many Excellent, Juvenile Works, well calculated for their Improvement; and we ardently hope they will embrace every Opportunity of acquiring not only Moral and Religious, but also Scientific and General Knowledge.

THEY MUST apply themselves diligently and perseveringly to Study, if they would excel in Learning and Science; for they may be assured that Knowledge does not spring up of itself, as a spontaneous Production.—They must first read such Books as are adapted to their Youthful Capacities; and as they advance in Years, and their Minds strengthen and enlarge, they must apply themselves to the Study of more abstruse Works on Mathematics, Philosophy, Theology, and other Branches of Scientific, General, and Practical Knowledge.

THEY MUST by their own immediate Observations, endeavour to make themselves acquainted with the Nature and Properties of Animals, Vegetables, Minerals, &c. &c.—They must *minutely* observe the Actions of Men;—remark the Consequences of those Actions;—and endeavour to find out the different Motives by which men are governed.—Thus, they will be enabled to distinguish between *Right* and *Wrong*;—between *Honour* and *Dishonour*;—between *Sincerity* and *DUPLICITY*.

BUT, above all, they must labour to obtain a thorough Acquaintance with themselves.—They must search out the Motives of their own Actions; and bring them to the Touchstones of *Reason* and *Conscience*.—They must set a strict Watch over the Inclinations and Desires of their own Hearts; lest, at any Time, they should be led astray from the Path of Honour and Virtue.—In short, they must learn to *see* with their own Eyes, to *hear* with their own Ears, to *understand* with their Hearts; and to *act* according to the dictates of Reason, Justice, Conscience, and RELIGION.

As an Encouragement to Assiduity and Perseverance in Study, and to show that Science and Religion are not incompatible with each other, but may both be united, in the same Individual; Young Persons should bear in Mind that Moses was learned “In all the Wisdom of the Egyptians;”—Solomon “Spake of Trees, from the Cedar Tree that is in Lebanon, even to the Hyssop that springeth out of the Wall;”—and St. Paul was brought up, and studied at the Feet of Gamaliel, a celebrated Jewish Rabbi.

THE REV. JOHN WESLEY, was an excellent Classical Scholar, an eminent Tutor at the University of Oxford, a good sacred Poet, a Philosopher, and an indefatigable and a powerful Preacher;—The Rev. John Fletcher, Vicar of Madeley, was a pious Divine, an eloquent Preacher, a celebrated Tutor, and an eminent Author;—The Rev. George Whitefield, was a good Classical Scholar, a powerful Writer, and an excellent, and a successful Preacher;—and The Rev. Dr. Watts greatly distinguished himself as a Tutor, an Author, a Preacher, and a Poet.

DR. NICHOLAS SAUNDERSON, lost his Sight, at the Age of Twelve Months, yet he became a learned Classic, a good Christian, and a great Mathematician;—Dr. Isaac Barrow was an eminent Mathematician, a celebrated Divine, and a sincere Christian;—and Sir Isaac Newton, who has been justly styled “The Prince of Mathematicians and Philosophers,” was a devout Christian; and spent much Time in reading and in illustrating the HOLY SCRIPTURES.

ONE GRAND CHRISTIAN VIRTUE, which we ought never to forget, is that we should endeavour “To do our Duty,” in a conscientious Manner, in whatever Situation, or under whatever circumstances we may be placed;—or, as the Church Catechism beautifully expresses it,—“To do our Duty in that State of Life, unto which it hath pleased God to Call Us.”

To THIS we are strongly urged, in many Parts of the Scriptures, both by Example and Precept:—Adam was a Tiller of the Ground;—Jacob and David were Shepherds;—several of the Apostles, were industrious Fishermen; and St. Paul was a Tent Maker, and tells us, that he worked Day and Night, with his own Hands;—and he also says, that if any one will not work, neither should HE EAT.

AND we must also remember that the Great Apostle of the Gentiles hath likewise said, “Be not slothful in Business: but fervent in Spirit; serving the Lord;”—and Solomon says, “Whatsoever thy hand findeth to do,—do it with thy Might; for there is no Work, nor Device, nor Knowledge, nor Wisdom, in the Grave, whither THOU GOEST.”

EXTRACTS FROM BISHOP HUNTINGFORD'S WORKS.

BISHOP HUNTINGFORD, says, “Either by agricultural, mechanical, or commercial Pursuits; either by professional Engagements in Letters, or Arts; either by juridical, or senatorial Deliberations; we are all required each in his proper Line, to be zealous for our own Credit and Character.”

for our Families, for our Friends, our Connexions, our Country. Zeal, exerted in behalf of all these Concerns, is Part of Religion;—for true Religion extends its Influence through every Department, and regulates every Action, both of public and private Life.—He, that on all Occasions, hath the Glory of God, immediately in his View, is indeed the more pious Man;—but every one, who discharges his Duty with Active Diligence and honest Fidelity, is doing the Will of God, and is so far religious.”

“AND, as in other Respects, so in this also, St. Paul sets us an Example, labouring as he did, with his own Hands, by Night and by Day.—To the same Purpose, strongly does he admonish us, when he gives it in Charge, that ‘if any will not work, neither should he eat.’—For, although, this Precept, in its literal Sense, cannot be applicable to Persons in all Circumstances; yet, in its wider Meaning, it is so far of Obligation, as that it enforces, on all Men, the Propriety of Attention to the peculiar Offices, which according to their respective Functions and Ranks, they owe to Society. Taken in this more enlarged Acceptation, the Precept is universally binding. For the Relation in which each of us is placed towards those around him, and the various Talents with which we are endowed, for the executing of Works, different indeed in themselves, but all tending ultimately to general Advantage; these manifestly indicate, that the Will of God ordains for each of us some Employment, alike beneficial to ourselves, and to the COMMUNITY.”

WORKS OF THE BRITISH POETS.

POETRY is acknowledged by all, to have a most salutary and elevating Effect upon the Mind; it represents to us the Passions, Affections, and Feelings of the Soul, and pours out the Effusions of the Brain; and at the same Time, it is one of the most effectual Means of storing the Mind with sublime Ideas, and with moral Knowledge, which is the most useful, valuable, and important of all Kinds of KNOWLEDGE.

PURE and Chaste Poetry is an excellent School for general Improvement; and it is universally admitted, that useful and popular Information, and moral and religious Sentiments, conveyed in Poetry or Metre, make stronger and more lasting Impressions on the Mind, than when they are inculcated in the Language of PROSE.

BESIDES these Advantages, we may also observe, that no Person who receives a liberal Education, should be entirely ignorant of Poetry; for to say nothing of the Pleasure, Amusement, and Improvement we derive by reading it, the Necessity of knowing the Works of our best Poets, in Order to take Part in modern Conversation, will make it apparent that it should receive considerable Attention in every *respectable and well-conducted SEMINARY.*

EXTRACT FROM THE POETICAL PRECEPTOR.

"MY MOTIVE for printing the Poetical Preceptor, originated in Desire to produce a Work that might be entertaining and instructive Youth in general; but particularly while receiving their Education in Schools. It is my Opinion, that all Young Persons should be made acquainted with the charming Graces of Poetry; and they will then perceive and understand what delightful harmony may be given to Language. Besides these Advantages, Poetry has frequently paved the Way to far more important Acquisitions; for it is well known, that many a Youth, from the Pleasure he has found in the Charms of Poetry, has taken such an Inclination to Reading, as, by opening the Mind, has facilitated his Improvement in every Branch of *useful* and *Scientific* KNOWLEDGE."

EXTRACT FROM SCOTT'S MUSE.

"THE MUSE! whate'er the Muse inspires,
My soul the tuneful strain admires:
The Poet's birth, I ask not where,
His place, his name, they're not my care:
Nor Greece, nor Rome delights me more,
Than Tagus' bank, or Thames's shore:
From silver Avon's flowery side,
Tho' Shakespeare's numbers sweetly glide,
As sweet from Morven's desert hills,
My ear the voice of Ossian fills."

"The Muse! whate'er the Muse inspires,
My soul the tuneful strain admires:
Or be the verse, or blank, or rhyme,
The Theme, or humble or sublime;
If Pastoral's hand my journey leads,
Thro' harvest fields, or new-mown meads;
If Epic's voice sonorous calls
To Oeta's cliffs, or Salem's walls;
Enough—the Muse! the Muse inspires!
My soul the tuneful STRAIN ADMIRES."

NOTES.

1. THE WORD GREECE, refers to Homer's *Iliad* and *Odysey*; the Word ROME, to Virgil's *Æneid*, Pastorals, and *Georgics*.
2. TAGUS BANK, alludes to Camoens, the Portuguese Epic Poet; whose *Lusiad* we have a masterly Translation by MICKLE.
3. THAMES'S SHORE, refers to Denham, Gay, Milton, Pope, and other Poets, who have sung of the Beauties of the *Thames*, and its lovely Banks.
4. THE POET, Shakespeare, was born at Stratford-upon-Avon, in the Year 1564.—Besides his Plays, he wrote One Hundred and fifty Sonnets, in which he embodies much of his own Character, Feelings, and daily Thoughts, with a Force and Pathos, in the highest Degree interesting and delightful.

5. MORVEN is a District of Argyleshire, in Scotland; and its Mountains are celebrated in the *Songs of Ossian*, as the Country of his Father, FINGAL.

6. MR. MACPHERSON published a Translation of Poems, which he attributed to OSSIAN; but their Authenticity has been disputed, by Dr. Johnson, and other Writers, and as zealously maintained by the Editor, and by Dr. Hugh Blair.—These Poems possess great Beauty; and no doubt, are the genuine Work of OSSIAN.

7. OETA'S CLIFFS, refer to a Military Way, called Thermopylæ, in Thessalia, near Mount Oeta, which is, in one Part, only 25 Feet in Breadth.—In this Pass, *Leonidas*, with 300 Spartans, resisted the Army of Darius; and in three Days, slew 20,000 Persians.—This happened, 480 Years before Christ.—On this Subject, *Glover* has published a very pretty Epic Poem, called LEONIDAS.

8. SALEM'S WALLS, refer to Jerusalem; Salem being one of the ancient Names of that City.—Tasso, an Italian Poet, has immortalized his Memory, by his *Epic Poem*, entitled *Jerusalem Delivered*.—Tasso died, at Rome, in 1595.—His Poem of *Jerusalem*, has been well translated into English, by HOOLE.

POETICAL WORKS.

THE FOLLOWING WORKS are generally considered to be among the Best Productions of our British Poets:—

HOMER'S *ILIAD* and *Odyssey*, translated by Pope;—Cowper's Translation of Homer, into Miltonic Verse;—Dryden's Translation of Virgil's *Æneid*, and his other Works; and Pitt's and Warton's Translation of VIRGIL.

MILTON'S *PARADISE LOST*, is written in Blank Verse; and is considered, by competent Judges and Critics, to be the *Best Epic Poem* in the English Language, or in any other Language; excepting only Homer's *Iliad*, and Virgil's *Æneid*.—Robert Chalmers says, "THE *PARADISE LOST* resembles nothing else in Literature; it stands on a Height by itself; and, as there are no other Themes of equal Sublimity, it will most probably never be matched."—Milton's *Paradise Regained*, though possessing many Beauties, is much inferior to his *PARADISE LOST*.

THOMSON'S *SEASONS*,—Spring, Summer, Autumn, and Winter, may be ranked among our best and most beautiful Poems; and they have been much read, and deservedly admired. They are written in Blank Verse; and describe the various natural Appearances of the Year, in rich and elegant Language.—Bloomfield's *Farmer's Boy*, is a very pretty Poem, in Rhyme; and gives a Description of the Four Seasons, in beautiful and simple Language. It has obtained a high Reputation, for its striking and touching Delineations of Rustic Life and Manners; and it may be considered as forming a very appropriate Introduction to THOMSON'S *SEASONS*.

WE must now go back to earlier Times, and mention the Poetical Works of Chaucer, who flourished at the Courts of Edward the Third, and Richard the Second; and who is allowed to be the Father of Genuine

many a Youth, from the Pleasure he
has taken such an Inclination to Res
facilitated his Improvement in every
KNOWLEDGE."

EXTRACT FROM S

" THE MUSE! whate'er the Muse
My soul the tuneful strain adm
The Poet's birth, I ask no
His place, his name, they're
Nor Greece, nor Rome del
Than Tagus' bank, or Than
From silver Avon's flowery
Tho' Shakespeare's numbers
As sweet from Morven's desc
My ear the voice of Ossian fill

" The Muse! whate'er the Muse
My soul the tuneful strain adm
Or be the verse, or blank, or sh
The Theme, or humble or sub
If Pastoral's hand my journey
Thro' harvest fields, or new-mow
If Epic's voice sonorous calls
To Oeta's cliffs, or Salem's wall
Enough—the Muse! the Muse in
My soul the tuneful STRAIN ADM

NOTES.

1. THE WORD GREECE, refers to Homer's *Iliad*
the Word Rome. to Virgil's *Æneid*. *Pastorals*. and

tude, and on the Progress of Poetry;—and Collins's *Ode to Evening*,—*Ode to the Passions*,—and *Ode on the Superstitions of the Highlanders of Scotland*.

AKENSIDE'S *Pleasures of the Imagination*, is a Poem, full of fine Imagery, and expressed in rich, copious, and musical Language;—Goldsmith's *Traveller*, and *Deserted Village*, are characterised by a delightful Combination of Simplicity, Elegance, and Pathos;—and Dr. Samuel Johnson's *Vanity of Human Wishes*, has a moral Dignity and Impressiveness that belong to few Writers, since the Time of POPE.

BEATTIE'S *Minstrel*, is characterised by a peculiar meditative Pathos;—Somerville's *Chase*, in Blank Verse, describes in a very animated Manner, the Circumstances attending that Kind of Field Sport;—Blair's *Grave*, a serious Poem, in Blank Verse, has always been admired for the strong and solemn Pictures which it draws of moral and religious Affairs;—Dyer's chief Poems, are *The Fleece*, and *Grongar Hill*;—Green's Poem, called *The Spleen*, is lively and descriptive;—and Glover is chiefly remembered for an Epic Poem, entitled LEONIDAS.

DR. ISAAC WATTS, wrote some beautiful *Lyric Poems*, chiefly on Religious Subjects;—Shenstone's *Pastoral Elegies*, have a softness and smoothness of diction, which is highly pleasing;—Falconer's *Shipwreck*, is a descriptive Poem, and has always been considered as a valuable Part of English Poetry; Smollett's *Ode to Leven Water*, displays much delicacy, and an elevated Tone, of Sentiment;—Armstrong, was a Physician, and is known by his instructive Poem entitled THE ART OF PRESERVING HEALTH.

LANGHORNE'S *Owen of Carron*, is peculiarly soft and melodious;—Bruce died at the early Age of twenty-one; his *Elegy on Spring*, and his Poem entitled *Locheven*, are highly respectable, considering his Youth;—Sir William Jones's *Lyric Odes*, are much admired;—Mickle chiefly remembered for his Translation of the *Lusiad* of Camoens, a Portuguese Poet;—and Logan was the Author of the well-known and beautiful *Ode to the Cuckoo*, and a Volume of very pretty POEMS.

COWPER'S Poems have been much read and admired; among them we may particularly mention *Table Talk*,—*Progress of Error*,—*Truth*,—*Hope*,—*Charity*,—*Conversation*,—and his beautiful Poem, called THE TASK.—Cowper also wrote the humorous and well-known Tale of JOHN GILPIN, which has so often tickled the risible Muscles of both the Aged and the Young.

JAMES MONTGOMERY, who is frequently stiled "*The Sheffield Poet*," is the Author of several Poetical Volumes, the most important of which, are entitled *Prison Amusements*,—*The Wanderers of Switzerland*,—*The West Indies*,—*The World before the Flood*,—*Greenland*,—*Songs of Zion*,—and THE PELICAN ISLAND.—All Mr. Montgomery's Works are characterised by purity and elevation of Thought, and Sentiment; harmonious Versification, and a fine Strain of religious and devotional FEELING.

WORDSWORTH, Coleridge, and Southey, are frequently denominated, "*The Lake Poets*;" and their Productions are far too numerous to be mentioned in this Essay;—Campbell's *Pleasures of Hope*, is a beautiful Poem,—and his *Lyrical Pieces*, have been well received by the Public.

—Henry Kirke White's *Clifton Grove*, has been much admired. He died at the early age of Twenty-one Years; and his Poetical Remains, published in three Volumes, by Mr. Southey, are chiefly of a moral and devotional Character; and without displaying great Energy, are read with much pleasure.—James Hogg, generally called the *Ettrick Shepherd*, has published several Volumes of Poems, that possess considerable MERIT.

SIR WALTER SCOTT's Poems of *The Lay of the Last Minstrel*;—*Marion*;—*The Lady of the Lake*;—*The Lord of the Isles*;—and *Rokeby*, were received by the Public, with such an Avidity, that Twenty-five Thousand of the Minstrel, were sold in Six Years; and all the other Works experienced a wonderfully rapid Sale.

THE REV. ROBERT MONTGOMERY's Poetical Works, have been well received by the Public; and have, already, gone through many Editions. All his Works are of a Moral and Religious Character; and cannot be too highly recommended to the Notice of Youth. His Omnipresence of the Deity, has experienced a wonderful Sale; and we may here observe, that this Work, and his Messiah, are particularly levelled against the Pernicious and Soul-destroying Principles of Deism, and Atheism.

THE POETICAL WORKS of Montgomery, are *The Omnipresence of the Deity*;—*The Messiah*;—*Death*; with other Poems;—*Satan*;—*Oxford*; with Biographical Notes;—and *Woman*; with other Poems.

NOTE. A CHEAP EDITION of the Omnipresence of the Deity, has been published, for the Use of Schools, by Simpkin and Marshall, London; and which may be had of all Booksellers.

LORD BYRON, as a Poet, stands high with the Critics; but we are of Opinion that most of his Works, are very *unprofitable* Reading, particularly for Young People; as they are nearly destitute of serious, moral, and religious PRINCIPLES.

ROBERT POLLOCK's *Course of Time*, is a Religious Poem, of Great Merit; and has already passed through Sixteen Editions.—We cannot too highly recommend this Work to our Readers; as every Page, nay, we might almost say, every Line breathes the Spirit of True Piety; with a firm Belief of the Immortality of the Soul, and of the Truths of the GOSPEL OF CHRIST.

REMARKS.

1. THE NAMES of many other British Poets might be recorded; and most of them have produced beautiful Poems, Odes, and other Pieces.—Nearly the whole of their Names, together with many of their best Productions, may be found in the *Poetical Preceptor*;—Tomkin's *Beauties of English Poetry*;—Mavor's *Classical English Poetry*;—and Mrs. Mant's *Parent's Poetical Anthology*.—All these Works are designed, and are well adapted to the Use of Schools; and for the general Improvement of Young People, particularly in making them acquainted with the Beauties and Sublimities of our BRITISH POETS.

2. MISS LUCY AIKIN'S "Collection of Poetry for Children," is an excellent Little Work; and contains a great Number of Short Pieces, carefully selected from our BEST POETS.

THE SEQUEL to Miss Aikin's Book, containing a "Selection of Poetry, for Young People," by M. A. P., is also a valuable Little Work; and comprises many beautiful Pieces of both Sacred and Miscellaneous POETRY.

3. JOSEPH HINE, ESQ., of Brixton, near London, has made a very *Excellent Selection*, from the Poems of William Wordsworth, Esq.; and which Work is chiefly intended for the Use of Schools and Young Persons.—These Beauties of Wordsworth cannot be too highly recommended to Pupils and Teachers;—the Thanks of Governesses, Masters, Parents, and Youth, are due to Mr. Hine, for this valuable SELECTION OF POETRY.

4. WILLIAM HAZLITT'S *Select Poets of Great Britain*, with Critical Notices of each Author, is also a valuable Work; but it is too large and expensive for the Use of Schools.

5. ROBERT POLLOCK, Author of *The Course of Time*, was born in 1799, of respectable Parents, at Muirhouse, in the Parish of Eaglesham, Renfrewshire, in Scotland. Owing to confinement, and the great Attention he paid to his Immortal Poem, he was attacked by a Pulmonary Complaint; and his medical Friends advised his Removal to a milder Climate.

IN 1827, he came to London, and resided, for some time, at Camberwell, with John Pirie, Esq., the present Lord Mayor; who treated him with every possible Kindness.—His Disease, however, gained Ground, and he was removed to the Neighbourhood of Southampton; where, on Sept. 15th, 1827, "He died in the Faith of the Gospel, and in the Hope of Eternal Life," at the early Age of 28 Years.

He is buried in Mill-brook Church-yard, in the Parish of Shirley Common; and over his Grave, is placed a Monument, with the following Inscription:—"The Grave of Robert Pollock, M.A., Author of the Course of Time. His Immortal Poem, is his BEST MONUMENT."

SACRED POETRY.

STERNHOLD, Hopkins, and Norton, turned into English Metre, a great many of David's Psalms; and this Translation, is still used in Some of

the Churches and Chapels, belonging to the Church of England.—Sternhold died in the Year 1549.

TATE and Brady, also translated the Psalms of David, into Metre; and this Translation has nearly superseded the Version of Sternhold.—Sternhold and Hopkins's Translation, is generally called, "*The Old Version*;" and Tate and Brady's, "*The New Version*."—Tate died, in 1715; and Dr. Brady died Rector of Richmond and Clapham, in Surrey, in the Year 1726.

DR. WATTS's Poetical Version of the Psalms of David, and his Beautiful Hymns, are well known; and are generally sung in Dissenting Congregations.—This truly Good Man, died at Stoke Newington, near London, in 1748; and in the 75th Year of his Age.

THE MORAVIANS, or United Brethren, have also an excellent Collection of Hymns; many of which have been Translated from the German.—Under this Head, we may likewise mention "*The Christian Psalmist*," by Mr. James Montgomery.

THE REV. JOHN WESLEY's COLLECTION of Hymns, are highly devotional; and are arranged under proper Heads, according to the Experience of Real Christians; so that this Work is, in Effect and Reality, a Little Body of Experimental and Practical Divinity.

It is used by the Wesleyan Methodist Congregations, in England, Wales, Ireland, Scotland, America, the West Indies, &c. &c.

SOME of the Hymns, in this Collection, are Translations from the German, and other Languages;—a few are taken, with some Alterations, from Dr. Watts;—a small Number of them, are the Composition of the Rev. John Wesley; but by far the greater Portion of these Beautiful Hymns, were composed by the REV. CHARLES WESLEY.

PERHAPS, we cannot describe the Merits of these Hymns, in more appropriate Language, than that used by the Rev. John Wesley, himself:—He says, "As but a small Part of these Hymns, is of my own composing, I do not think it inconsistent with Modesty, to declare, that I am persuaded no such Hymn-book as this, has yet been published, in the English Language.—In what other Publication of the Kind, have you so distinct and full an Account of Scriptural Christianity?—such a declaration of the Heights and Depths of Religion, speculative and practical?—so strong Cautions against the most plausible Errours; particularly those that are now most prevalent?—and so clear Directions for making your Calling and Election sure;—for perfecting Holiness in the FEAR OF GOD."

VOYAGES AND TRAVELS.

VOYAGES.

"THEY that go down to the Sea in Ships, that do Business in great Waters; these see the Works of the Lord, and his Wonders in the DEEP."—(*Psalms the Hundredth and Seventh.*)

SEAMEN have many Opportunities of beholding not only the Wonders of the Lord, in the Great Waters; but also

in the Firmament that is above the Waters. They can speak of dangerous Rocks and violent Whirlpools; of dreadful Hurricanes and overwhelming Waterspouts; of forked Lightnings and tremendous Thunder Storms; and it is from them that we acquire our Knowledge of many of the Phenomena of the ATMOSPHERE.

WE are also indebted to them for the Latitudes, Longitudes, and Situations of many different Places, by which we are enabled to correct and improve our Maps and Charts; and they likewise make us acquainted with the Nature of different Climates; with the intense Cold of the polar Regions; with the Mildness and Beauty of the temperate Zones; and with the scorching Rays of the torrid or burning Zone.

FROM our Mariners, we become acquainted with many of the Manners, Customs, and Laws of different Nations; with the Productions of different Countries, &c. &c.;—indeed, well written and authentic Accounts of Voyages and Travels, add greatly to our Sources of Pleasure and Amusement; and to our Maritime and Geographical KNOWLEDGE.

THE ANNALS of the following Voyages which were performed by Able, Experienced, and Scientific Seamen, will be read with Pleasure and Improvement by our JUVENILE FRIENDS.

COLUMBUS's LIFE, Voyages, and Discoveries;—Lord Anson's Voyage Round the World;—Captain Cook's Voyages;—Lives and Voyages of Drake, Cavendish, and Dampier;—Captain Parry's Three Voyages for the Discovery of a North West Passage;—Captain Ross's Voyages for Ditto;—Holman's Voyage Round the World;—Historical Account of the Circumnavigation of the Globe;—and the Adventures of BRITISH SEAMEN.

NOTES.

1. WIND is Nothing more than the Atmosphere put into Motion; and its Force or Velocity is almost infinite in its Variations, from the pleasing and gentle Breeze, to the terrific and devastating Hurricane, which tears up Trees, and overturns Buildings.—In a gentle pleasant Breeze, the Velocity of the Wind may be from 4 to 6 Miles per Hour; Brisk, from 10 to 15, &c.; High, from 25 to 35, &c.; Very high, from 40 to 50; and from thence, to a Hurricane of 100 Miles per Hour, which overturns Trees, lifts Ships out of the Water; and carries Buildings before it.—Lunardi, on one Occasion, went at the Rate of 70 Miles an Hour, in his Balloon; and Garnerin at the Rate of 80; proving the Velocity of the Wind, at that Time, to be One Mile and one-third per MINUTE.

2. THE FORCE of the Wind, of Course, varies according to its Velocity.—The celebrated Engineer, Smeaton, says that Wind, with a velo-

city of 4 or 5 Miles per Hour, has a Force of about two ounces on a square foot; from 10 to 15, twelve ounces; from 20 to 25, two or three pounds; from 30 to 35, five or six pounds; from 40 to 45, eight or nine pounds; &c. &c.; and a Hurricane, with a velocity of 100 Miles per hour, has a Force of 49 or 50 pounds, Avoirdupois, on every square foot of perpendicular surface, that meets the Wind, at RIGHT ANGLES.

TRAVELS.

“THEY wandered in the Wilderness, in a solitary Way; they found no City to dwell in.—Hungry and thirsty, their Soul fainted within THEM.”—(*Psalm the Hundredth and Seventh.*)

How truly does this Quotation depicture some of the Wanderings in the Wilderness, and many of the Toils, Hardships, and Dangers that Travellers have frequently encountered and endured; and it agrees well with the Accounts given by Bruce, Park, Humboldt, Clapperton, and many others, who left their *Native Land*, to explore the unknown Regions of distant and uncivilized COUNTRIES.

BUT, however laborious and dangerous it may be to travel in some Countries; yet in others, it is attended with the greatest Advantage and Pleasure; and the Accounts that are given of the Climate, Productions, Curiosities, Manners, Customs, and Characters of different Nations, tend greatly to increase both our General, Historical, and Geographical INFORMATION.

THE FOLLOWING WORKS have been much read and approved by the Public; and we therefore recommend them to our Young Readers, as containing never failing Sources of Amusement and Improvement:—

BRUCE's LIFE and Travels in Abyssinnia;—Park's Travels in Africa;—Clapperton's Last Expedition to Africa;—Humboldt's Travels and Researches;—Lander's Travels in Africa;—Campbell's Overland Journey to India;—Tour through South India, Egypt, and Palestine;—Waddington's Visit to Greece;—Archar's Tours in Upper India, and the Himalaya Mountains;—and Auldjo's Journal of a Visit to CONSTANTINOPLE.

BAKEWELL's Travels in the Tarentaise, Alps, Switzerland, and Auvergne;—Cochrane's Pedestrian Journey through Russia and Siberian Tartary;—Waterton's Wanderings in South America;—Barrow's Excursions in the North of Europe, through Parts of Russia, Finland, Sweden, Denmark, and Norway,—his Tour Round Ireland,—and his Visit to Iceland;—Back's Narrative of the Arctic Land Expedition;—and Lewis's and Clarke's Travels to the Source of the Missouri River, and across the American Continent, to the PACIFIC OCEAN.

BUCKINGHAM's Travels in Assyria, Media, and Persia;—Campbell's Letters from the South;—Chateaubriand's Travels in America and Italy;—Coulton's Tour of the American Lakes;—Conway's Narrative

of a Journey through Norway, Sweden, and Denmark,—and his Tour through Switzerland, the South of France, and the Pyrenees;—Cooper's Excursions in Switzerland;—Denham, Clapperton, and Oudney's Travels in Africa;—Ellis's Polynesian Researches;—Laborde's Journey through Arabia Petrea to Mount Sinai;—Latrobe's Rambler in North America;—Arundell's Visit to the Seven Churches of Asia;—Hartley's Researches in Greece and the Levant;—Addison's Damascus and Palmyra;—Voyages and Travels Round the World, by Tyerman and Bennet;—and Williams's Missionary Enterprises, in the SOUTH SEA ISLANDS.

NOTE.—MANY of the Works that we have recommended in different Parts of this Essay, may be obtained at a very moderate Rate, from CIRCULATING LIBRARIES.

WORKS ON MISCELLANEOUS SUBJECTS, AND ON GENERAL AND SCIENTIFIC KNOWLEDGE.

MANY EXCELLENT BOOKS have been published for the Education and Improvement of Youth, besides those we have mentioned, under the different Sciences; and as we could not place them in any particular Department of Education, we have made a Miscellaneous Selection of such Works as are replete with Useful and Popular INFORMATION.

MAUNDER's Scientific and Literary Treasury,—his Treasury of Knowledge,—and his Biographical Treasury;—Guy's Pocket Cyclopædia;—Bingley's Useful Knowledge,—and his Animated Nature;—Mudie's Earth,—his Heavens,—and his British Naturalist;—the Mine,—the Ship,—Scenes of Commerce, by Land and Sea,—and Scenes in Europe, Asia, Africa, America, &c. &c., by ISAAC TAYLOR.

THE SEVEN AGES OF ENGLAND, by C. Williams;—the Results of Machinery;—the Rights of Industry;—the Working Man's Companion;—Uncle Philip's Conversations about the Whale,—and his Conversations about the Tools and Trades of Animals;—Whitehead's Boy's own Book,—and his Parlour Magic;—Book of Trades, by Tegg and Son;—Valpy's Elements of Mythology;—and Hart's Chronology,—and his PANTHEON.

THE REV. JOHN WESLEY's Natural Philosophy, by Mudie,—and his Treatise on Logic, by Jackson;—Trusler's Progress of Man and Society;—Rennie's Alphabet of Physics,—his Alphabet of Chemistry,—and his Alphabet of Modern Philosophy;—Chemistry no Mystery, by J. Scoffon;—Steps to Mineralogy, by Harvey and Darton;—Venning's Rudiments of Mineralogy,—and her Rudiments of Conchology;—Wodarch's Introduction to Conchology;—Roberts's Conchologist's Companion;—Charles's Discoveries in Natural History, by Harvey and Darton;—Wonders of the Microscope and Telescope;—Wakefield's Animal Instinct;—and Higgins's Physical History of the EARTH.

PETER FARLEY's Tales about Europe, Asia, Africa, and America,—also his Tales about England, Ireland, Scotland, and Wales;—the Young

Man's Aid to Knowledge, by Tegg and Son;—Antrobuss's Student's Manual of Mercantile Knowledge;—White's Natural History of Seborne;—Scripture Natural History, by W. Carpenter,—and also his Biblical Companion;—Mudie's Spring, Summer, Autumn, and Winter;—Peter Parley's Lives of Franklin and Washington;—Marceet's Conversations for Children, on Land and Water;—Wakefield's Juvenile Travellers, or Tour through Europe, and also her Tour through the BRITISH EMPIRE.

HERVEY'S MEDITATIONS;—Sturm's Reflections, particularly Dr. Adam Clarke's Edition, with Notes;—Chambers's History of the English Language and Literature;—Kett's Elements of General Knowledge;—Morning Conversations of a Governess and her Pupils;—Tales of Distant Lands;—The English Mother's Catechism, by the Rev. T. Clark;—The Little Mineralogist, by Rev. T. Wilson;—Mawe's Familiar Lessons on Mineralogy and Geology,—and his Introduction to Conchology;—Readings in Science and Natural Philosophy;—Mechanics applied to the Arts, by the Rev. Henry Moseley, M.A.;—Natural Theology Considered, by Dr. Thomas Turton;—the Connexion of Natural and Divine Truth, by the Rev. Baden Powell, M.A.;—a Treatise on Logic, and a Treatise on Rhetoric, by Archbishop Whateley;—and Chemistry, in its Applications to Agriculture and Physiology, by Justus Liebig, M.D., PH. D., F.R.S.; and Edited by Lyon Playfair, PH. D.;—SECOND EDITION.

WORKS DESIGNED FOR THE PARTICULAR IMPROVEMENT OF YOUNG MEN.

NOTWITHSTANDING, we have already mentioned a great many Excellent Works, for the General Improvement of Youth; yet, we have still to notice a few that have been written by men of great Talent, much Experience, and genuine Piety, for the particular Information, Guidance, and Improvement of YOUNG MEN.

WE SHALL first mention Sir Matthew Hale's Counsels of a Father to his Children; and his Letters of Advice to his Grandchildren;—Dr. John Fawcett's Practical Treatise on Faith and Love;—Character Essential to Success in Life, by the Rev. Isaac Taylor;—Dr. Hugh Blair's Advice to Youth;—Dr. James Fordyce's Addresses to Young Men;—and the Rev. William Jones's Letters to his PUPILS.

ARCHBISHOP WHATELEY's Treatise on Logic;—Dr. Watt's System of Logic,—and his Improvement of the Mind;—Locke's Conduct of the Understanding;—Mason's Self Knowledge;—Dr. Knox's Literary and Moral Essays;—The Young Christian, by Jacob Abbott, edited by the Rev. J. W. Cunningham, Vicar of Harrow;—and the Rev. John Todd's Student's Guide; a Work in which the Author has displayed a thorough Knowledge of HUMAN NATURE.—We strongly recommend this Work to the Attention of all Young Students; but particularly to those who are preparing for Ministers of the GOSPEL. (See Extracts, Pages 62nd, and 63rd, of this ESSAY.

NOTE.—Some of the preceding Works, have already been mentioned; but as they are so well calculated for the Improvement of Youth, we wish to recal them again to the Attention of our YOUNG READERS.

WORKS WRITTEN FOR THE PARTICULAR IMPROVEMENT OF YOUNG LADIES.

THE IMPROVEMENT of the Ladies of Great Britain, in Useful, and General Knowledge, and in Literature, Philosophy, and Science, is an Object of Great Moment; as upon them falls the Important Duty of becoming the FIRST INSTRUCTORS OF BRITISH YOUTH.

MANY of the Works already mentioned in this Essay, are equally as well adapted for the Improvement and Information of Ladies, as they are for Gentlemen; but there are other Works, of Great Value and Merit, that have been written by Persons of extensive Knowledge, and great Experience and Prudence; and which are almost entirely adapted for the Use, Information, and Improvement of the FEMALE SEX.

WE SHALL first mention Burton's Lectures on Female Education and Manners, which is an excellent Work; and was composed expressly for the Use of Female Schools, and for the Advantage of Young Ladies, after they have finished their EDUCATION.

MRS. HANNAH MORE's Strictures on the Modern System of Female Education, is a valuable Work, and has gone through several Editions;—and Mrs. Barbauld's Legacy for Young Ladies, and her Essay on Christian Education, are Works of acknowledged MERIT.

MRS. TAYLOR's Practical Hints to Young Females, on the Duties of a Wife, a Mother, and the Mistress of a Family; and her Maternal Solicitude for a Daughter's Best Interests, have been much read, and are worthy of the highest COMMENDATION.

DR. JOHN GREGORY's Advice to his Daughters;—Mrs. Chapone's Letters to her Neice, on the Improvement of the Mind;—and the Young Lady's Friend; or a Manual of Practical Advice and Instruction to Young Females—written by a Lady, are valuable Productions.

THE FEMALE CHARACTER, by Albert Pennington, is a new, neat, and well written Little Work; and does the Author much Credit.—He says, in the Preface, "That if the Portrait be highly finished, it exhibits Female Character, as it ought to be; and that no Young Lady should rest satisfied, until she see therein, as in a MIRROR, her own IMAGE REFLECTED."

MRS. ELLIS's "Women of England;" their Social Duties and Domestic Habits;—and her "Daughters of England;" their Position in Society, Character, and Responsibilities, are both recent Publications; and are

likely to become very popular, not only with the Ladies, but also with the Gentlemen; because both these Works are well calculated to improve the LADIES.—They recommend to the Notice of the “Women of England,” not only Literature and Science; but likewise Domestic Management, and ECONOMY.

“THE MENTAL and Moral Dignity of Woman,” by the Rev. B. Parsons, is also a New Work, and will afford more real Improvement, to the Ladies of Great Britain, than reading TEN THOUSAND VOLUMES OF NOVELS !!!

DR. TRUSLER’S “Domestic Management,” is a valuable Little Work;—has gone through numerous Editions;—and should be in the Hand of every Young and Inexperienced Female.—The Author says, “Of all useful Knowledge, little as it has been attended to, and much as it has been wanted, that of instructing Young Women, in the Arrangement and Conduct of Domestic Concerns, is by no Means, the least;—it not only conduces to their own Happiness and Comfort, but also to the Happiness and Comfort of those Families of which the Custom of Countries, has given them the DIRECTION.”

REMARK.

Most of the following Works have been mentioned in different Parts of this Essay; but as they are all written by Ladies, we think it our Duty to offer them again, to the Notice of the “Daughters of England;” as they clearly evince, that Scientific Pursuits are not confined exclusively to the SONS OF GREAT BRITAIN. (*See Observations and Remarks, on the 84th, Page of this Essay.*)

MRS. MARCET’S Conversations on Chemistry; her Conversations on Natural Philosophy; and her Conversations on Vegetable Physiology;—Conversations on Botany, written by a Lady, and published by Longman and Co.;—Mary Anne Venning’s Rudiments of Mineralogy; and her Rudiments of Conchology;—Mrs. Somerville’s Connexion of the Physical Sciences;—Priscilla Wakefield’s Introduction to Botany; and her Instinct of the Animal Creation Displayed;—and Maria Hack’s Geological Sketches; her Lectures at Home; and her neat Little Volume on the EVIDENCES OF CHRISTIANITY.

EXTRACTS FROM VARIOUS AUTHORS.

WE HOPE the following Extracts will be read with both Pleasure and Profit, by our Young Female Friends; as they convey much good Advice and Instruction; and have been selected from Works written by Persons of acknowledged Merit and Talent, and of great EXPERIENCE.

“GIVE EAR, Fair Daughter, to the Instructions of Prudence; and let the Precepts of Truth sink deep into thy Heart.”—*Economy of Human Life.*

“The bare Consideration of parental Affection, should create a most grateful Tenderness in Children, towards their Parents; and the silent

Whispers of Nature should be regarded, though the Laws of God and Man did not call aloud,"—*Spectator*.

"If you aspire after Knowledge, you will listen to her voice.—Without Attention, you can profit but little;—no Proficiency can be made in any Course of Study or Learning, without Application."—*Burton*.

"Without your best Exertions, the Concern of others for your Welfare, will be of little Avail; with them you may fairly promise yourselves Success. The Writer of this Address, therefore, recommends to you, an earnest co-operation with the endeavours of your Friends, to promote your Improvement and Happiness."—*Murray*.

"An obstinate Disposition is a great Enemy to Improvement.—The Endeavours of Teachers to Instruct, will be of little Avail, if the Pupils are determined to disobey their commands, or be inattentive to their Admonitions and Advice."—*Burton*.

"She, who has no Taste for well-written Books, will often be at a Loss how to spend her Time; and the Consequences of such a State, are too frequent not to be known, and too fatal not to be dreaded."—*Knox*.

"The Advantages of Reading can only be derived from a proper Choice of Books.—That Course of Reading must be unprofitable, which is confined to Novels; as there are but very few of them that have a Tendency to give a right Turn to the Affections, or which are calculated to improve the Mind."—*Burton*.

"A cultivated Mind renders the most graceful Form more pleasing;—nay, there is no Grace without it; nor any beauty that will charm for half an Hour, which does not arise from an artless Display of Virtue and Sense."—*Female Reader*.

"You must form and govern your Temper and Manners, according to the Laws of Benevolence and Justice; and qualify yourself, by all Means in your Power, for a useful and an agreeable Member of Society."—*Mrs. Chapone*.

"The smallest Disappointment in Pleasure, or a little Difficulty in the most trifling Employment, will put some young People out of Temper; and their very amusements frequently become Sources of Vexation and Peevishness."—*Mrs. Chapone*.

"If you would gain the Favour of the Deity, you must be at the pains of worshipping Him; if the Friendship of good Men, you must study to deserve it."—*Tatler*.

"Virtue and Happiness are not attained by Chance, nor by a cold and languid Approbation; they must be sought with Ardour, attended to with Diligence, and every Assistance must be eagerly embraced, that may enable you to obtain them."—*Mrs. Chapone*.

"Many a Female, because she has been educated at a Boarding School, returns Home, not to assist her Mother; but to support her Pretensions to Gentility by Dress and Idleness."—*Mrs. Taylor*.

"Every wise Woman buildeth her House, but the foolish plucketh it down with her Hands."—*Solomon*.

"Young Women are usually ambitious of nothing more than to be admired for their Persons, their Dress, or their *trivial* Accomplishments."—*Mrs. Chapone.*

"Economy is so important a Part of a Woman's Character, so necessary to her own Happiness, and so essential to her performing properly her various Duties; that it ought to have the Precedence of all other Accomplishments."—*Mrs. Chapone.*

"To love Frugality, we must practise and enjoy it.—It is not those who are enervated with Pleasure, that are fond of a frugal Life; neither is it those who envy and admire the Luxury of the Great."—*Montesquieu.*

"Study and Amusement have each their Delights; and at School, may seasonably succeed each other; but they should always be kept at their proper Distance. Suspend, therefore, all Giddiness and Mirth, till the Time of Instruction is over. Your Lessons will then be more deeply impressed on your Memories; and you will, with more Facility, attain that Knowledge which is the immediate Object of your Pursuits."—*Burton.*

"Universal Knowledge can never be attained; a proper Selection, therefore, is of the greatest Importance; and, to this End, a relative value must be stamped on each Pursuit."—*Goodacre.*

"A judicious Tutor will consider his Duty as comprising a vast Field for Exertion, Independently of the important Act of *rightly* teaching the Sciences, much remains for his Attention; and when both the Teacher and the Pupil feel a lively Interest in the Work of Improvement, the Labour of Education is shortened, and sure is the Progress of Knowledge."—*Goodacre.*

"That Cultivation of the mental Powers, which will lead moral Agents to think justly, to feel rightly, and to act prudently, is the most essential Branch of Education."—*Hort.*

"The Contriver of any successful Method of imparting Knowledge, or the Author of any lucid elementary Book, ought always to be ranked among the Benefactors of Mankind."—*Dr. Johnson.*

"Many Persons do not feel, with due Force, the intimate Connection which exists between the Production of good elementary Books, and the Extension of the various Subjects of Education. They do not consider, that to expect the Conductor of a School to introduce a subject of Instruction, without the Aid of a good elementary Treatise, is like the Expectation of the King of Egypt, 'that the Israelites should make Bricks without Straw.'"—*Sir Richard Phillips.*

We shall close these Extracts with an impressive Admonition from a Writer to whom we are all much indebted for the Improvement of the English Language.

"Catch then, O catch, the transient hour,
Improve each moment as it flies:
Life's a short summer, man a flower;
He dies; alas! how soon he dies!!"—*Dr. Johnson.*

IMPROVED SCHOOL BOOKS.

THE OLD SPELLING BOOKS of Dyche, Dilworth, Fenning, Markham, and Vyse; and the Old Pleasing Instructor, and other similar Productions, have all been laid aside, in every Respectable School; and more modern Works have been introduced, better adapted to the improved State of Education and Knowledge.

MANY of these Books have been written by Eminent and Experienced Teachers; and contain much useful Information, on various Subjects, well calculated for the Instruction and General Improvement of YOUTH.

SPELLING AND READING.—MURRAY's Spelling Book;—Mavor's Spelling Book;—and Joseph Guy's, and John Guy's Spelling Books, are all good introductory Works.

EXPOSITORS.—KNOWLES's Expositor;—Hornsey's Expositor; and Butter's Expositor.—Knowles's Work is a good Book;—gives the Accents, the Parts of Speech, and the Meanings of the Words;—and has gone through many EDITIONS.

HORNSEY's Expositor is an Excellent Book, for the Improvement of Pupils.—Besides giving the Parts of Speech, and the Meanings; it also gives the Pronunciation of the Words, in which not only the Accents are marked, but likewise the Long and Short Sounds of the Vowels.—This Work is now in the EIGHTEENTH EDITION.

MR. BUTTER's Work, is also an Excellent Book; and gives the Etymology or Derivation of a great Number of Words, from the Latin and Greek. It is, however, rather too difficult for Beginners; but is well adapted for the Improvement of SENIOR PUPILS.

ROWBOTHAM's Derivative Spelling Book, and his Derivative and Etymological Dictionary, are both Excellent Works; and are well calculated for assisting Young Persons in acquiring a thorough Knowledge of the ENGLISH LANGUAGE.

NOTES.

1. AN EXCELLENT METHOD of improving Boys, in Spelling, is by DICTATES, delivered by the Teacher, from any Book; and written on Slates, or on Paper, by the Pupils.—The best Work, with which we are acquainted, for this Exercise, is Bearercroft's "Practical Orthography; or the Art of Teaching Spelling by WRITING."

2. MR. WILLIAM BEARCROFT, conducted, for many Years, an Excellent School, at Kirkby Moorside; and MR. JOHN HORNSEY, was for a great Number of Years, Master of a Celebrated Academy, at Scarborough.—MR. NESBIT was a Pupil with both these Excellent Teachers, and Conductors of Seminaries; and remembers them with Gratitude.—MR. N. also received many kind Attentions, in his Private Studies, from the Rev. Archdeacon WRANGHAM.

READING AND CLASS BOOKS.—In this Department of Education, so many Excellent Works have been published, that it requires no small share of Judgment and Experience, to select those that are best adapted to the different Ages and Capacities of YOUTH.

MR. MURRAY's Introduction to the English Reader, his English Reader, and his Sequel to the English Reader, are all excellent Works; have gone through numerous Editions; and still keep their Ground, in Schools of the FIRST RESPECTABILITY.

HORNSEY's Monitor;—Souter's First School Reader;—the National Reader, by Edward Wickes;—the Elements of Reading, by the Rev. J. Adams, M.A.;—Hamilton's Comprehensive Reader;—the Scientific Reader, by R. T. Linnington;—and the Rev. David Blair's Class Book, containing *Three Hundred and Sixty-five Lessons*, selected from the BEST AUTHORS.

THE PRINCIPLES of Elocution, by W. Graham;—Exemplary and Instructive Biography, by W. and R. Chambers;—Poetical History of England, by the Rev. N. Meeres, B. D.;—Chronology Made Easy, by the Rev. John Cockerton, M.A.;—the Geographical Class Book, by G. A. Hansard;—the Literary and Scientific Class Book, by the Rev. John Platts;—and Lessons on Life, Men, and Manners, by the Rev. George Hall, M.A.

NOTE.—PINNOCK's improved Editions of Dr. Goldsmith's History of England, his History of Rome, and his History of Greece; still further improved and enlarged by Dr. W. C. Taylor, are excellent and splendid School Books; and are all published by Whittaker and Co. LONDON.

ELOCUTION.—THIS DEPARTMENT of Education receives much more Attention, in our most respectable Schools, at the present Time, than it did at any former Period; and it certainly requires no learned Arguments to prove, that clear, full, distinct, and forcible Articulation, in READING and SPEAKING, is both an ornamental and a useful ACCOMPLISHMENT.

DR. ENFIELD says, "Every one will acknowledge it to be of some Consequence, that what a Man has hourly occasion to do, should be done well.—Every private Company, and almost every public Assembly afford Opportunities of remarking the Difference between a just and graceful, and a faulty and unnatural Elocution; and there are few Persons, who do not daily experience the Advantages of the former, and the inconveniences of the latter Mode of DELIVERY."

MRS. BARBAULD says, "Graceful Reading is most pleasing; and it is a scarce Accomplishment.—It is seldom attained, without some practice in reciting; which necessarily demands a full, distinct Utterance, at those Tones and Cadences, which bring out the Sense of the Author and the Harmony of his PERIODS."

SPEAKERS.—THE REV. DR. ENFIELD'S *Speaker*, has gone through many Editions; and so has Mr. John Walker's *Academic Speaker*.

MRS. BARBAULD'S *Female Speaker*, contains many beautiful and instructive Pieces, selected from the Best Authors, for the particular Use of YOUNG LADIES.

LINNINGTON'S *Rhetorical Speaker and Poetical Class Book*, contains Prefatory Observations on the Origin and Structure of Languages, &c. &c.

DR. MAJOR'S *Speaker*, has long been before the Public; and Mr. Joseph Hinchcliffe, of Horton House, near Bradford, Yorkshire, has also published a very Excellent *School Speaker*, with Plates.—He has likewise published a "*Dictate Book*," containing Selections, both in Prose and Verse, from many of our Best Authors.—This Work is well adapted for a *Class Book*, in Schools.—Both these Works are sold by Simpkin, Marshall, and Co., London; and may be had of all BOOKSELLERS.

ENGLISH GRAMMAR.—WE HAVE, already recommended Mr. Murray's *Grammar*, on the Twentieth Page of this Essay; but in Order to obtain a Critical Knowledge of this Subject, Young Persons should read several of the best Grammatical Works.

MR. HORNSEY'S *Grammar* has gone through several Editions; and so has Mr. Lennie's; and Dr. Ash's *Little Work*, was formerly much used in Schools.—Mr. Hiley has also published a good *Practical Grammar*, which is very similar, in many Respects, to Mr. Murray's Work.

THE GRAMMARS of Dr. Lowth, Dr. Coote, Mr. Angus, and Mr. Grant are good Critical Works; and we also strongly recommend Crombie's *Etymology and Syntax*, Campbell's *Philosophy of Rhetoric*, Blair's *Essays on Rhetoric*, Walker's *Rhetorical Grammar*, and his *Elements of Elocution*, Irving's *Elements of English Composition*, and the Rev. John Platts's *Dictionary of ENGLISH SYNONYMES*.

COMPOSITION.—WE HAVE, on the Twenty-first Page, and on the following Pages of this Essay, noticed Composition, at considerable Length; and it seems only necessary here, to mention a few of the best Books that have been written by Men of Talent, and Ingenuity, for assisting Young Persons, in acquiring the Art of ENGLISH COMPOSITION.

MUCH ASSISTANCE, may undoubtedly, be derived from such Works; but after Pupils have availed themselves of all such Helps, still Nothing will accomplish this desirable Object, except committing their own Thoughts and Contemplations to Writing, in the Form of THEMES, ESSAYS, or LETTERS.

NOTES.

1. AN excellent and easy Method of improving Boys, in Composition is to direct them to *Transpose*, or *Turn* Poetry into Prose;—using *any* Words, at Pleasure, that will express or convey the original Meaning of the Poet.

2. WALKER'S "Teacher's Assistant, in English Composition; or *Easy Rules for Writing Themes, and Composing Exercises, on Subjects Proper for the Improvement of Youth,*" is an Excellent Work; and has been found of great Service to Learners, both in Schools, and in their Private Study of the ENGLISH LANGUAGE.

3. RIPPINGHAM'S "Rules for English Composition, and particularly *Themes; designed for the Use of Schools, and in Aid of Self-Instruction,*" is also a valuable Production; and has been found well to answer the intended Purpose of giving Assistance to YOUTH.

4. WE MUST, again, call the Attention of our Readers, to "The Classical English Letter Writer;" and also to the Commercial Letters, given in NESBIT'S PRACTICAL ARITHMETIC. (*See Page the 22nd, of the Essay.*)

SYSTEMS OF CLASSICAL INSTRUCTION.

THE IMPROVEMENTS that have taken Place, in communicating Knowledge to Youth, have extended themselves even to Classical Literature; and we now have THREE METHODS of Teaching the Latin, Greek, French, and other LANGUAGES.

FIRST, we have the OLD SYSTEM, that has long been established in Classical Schools; where Grammars and Dictionaries are used; but no Translations are allowed except such as are made by the PUPILS.

SECONDLY, we have the Primitive or ORIGINAL SYSTEM recommended by Colet, Ascham, Milton, and Locke; in which Grammars, Dictionaries, and Free Interlinear Translations are used; it being considered that these Translations are of great Assistance to the PUPILS.

THIRDLY, we have the HAMILTONIAN SYSTEM of Teaching Latin, Greek, French, German, Italian, or Spanish, by Means of Literal, Interlinear Translations;—the first Rudiments of Grammar being taught, *verbally*, by the Master in reading the LESSONS.

AFTER the Pupils have obtained some Knowledge of the Nature and Idioms of the Language; then Grammars, Dictionaries, and Exercise Books, are introduced; and their Uses are shown and explained to the PUPILS.

EACH of these Methods, has its Admirers and its Advocates; and each Method, undoubtedly, possesses peculiar

Merits; but we are of Opinion that a Union of all these Methods, must form the BEST SYSTEM of Teaching the Languages; and that both Tutors and Pupils ought to avail themselves of every Assistance that is calculated to Smooth the Path of Literature; and render the Ascent of the Hill of Science as easy, as pleasing, and as expeditious as POSSIBLE.

AND, even when this has been done, to the utmost Extent; still Nothing will make Eminent Scholars, either in Mathematical or Philosophical Science, or in Classical Literature; but great Assiduity and Perseverance on the part of the PUPILS, joined with *good, sound, and diligent* Teaching, by the MASTERS.

NOTES.

1. THERE can be no Doubt, that by proper, judicious, and diligent Teaching, the Acquisition of every Science, and of every Branch of Literature, might be much facilitated; and Learning and Study rendered much more easy and pleasing to Pupils, than has generally been done, by many Instructors of YOUTH.

2. THE REV. JOHN WESLEY says, "I see not why a Man of tolerable Understanding, may not, in Six Months' Time, learn more of Solid Philosophy, than is commonly learned at Oxford, in Four, or perhaps, even in SEVEN YEARS."

3. MILTON says, "We do amiss to spend seven or eight Years, merely in scraping together so much miserable Latin and Greek, as might be learned otherwise easily and delightfully, in ONE YEAR."

4. LOCKE says, "At the Entrance upon any Sort of Knowledge, every Thing of itself, is difficult; and the great Use and Skill of a Teacher, is to make all as easy as he can; but particularly in the Learning of LANGUAGES."

5. CLEMENT MOODY says, "Much, undoubtedly, is to be done *viva voce*, by the Master, in defining, in illustrating, and in simplifying;—for, the Rules of Grammar, like the Rules of any other Science, must be explained, before they can be said to be thoroughly and satisfactorily understood;—yet surely Something, even in this Respect, should be left to the Learner's own Industry and Ingenuity.—Then, the Pupil ought to begin the most Important Process in all Learning—SELF-EXAMINATION:—then commences the Pupil's own Personal Exertion, to reflect upon, and himself apply, what he has been told by the Master; and not simply to commit to Memory, or to neglect, as he may choose, what has necessarily been written for his Information and Improvement."

6. THE HAMILTONIAN SYSTEM has been pronounced, by the Edinburgh Review, "One of the most useful and important Discoveries of the Age;"—and by the Westminster Review, "The most extraordinary Improvement in the Method of Instruction, which the Ingenuity of the

human Mind has hitherto devised."—This Review, also ascribes to the Author of the Hamiltonian System, exclusively, "The great Merit of introducing Translations, made in invariable Accordance with a Principle of a strict verbal Analysis;" and, it likewise remarks, that "this Peculiarity which renders them such invaluable Instruments to the LEARNER."

LATIN GRAMMARS.

THE ETON LATIN GRAMMAR is used in a great Majority of the Classical Schools, in England; and there have been many Improved Editions of this Work, by Mavor, Prattent, Edwards, Smith, and others; but the best Edition that has yet appeared, is that by Clement Moody of Magdalene Hall, OXFORD.

DR. VALPY has published the Elements of Latin Grammar, with Notes;—G. A. JACOB, M.A., has published a Latin Grammar, for the Use of Schools and Colleges;—and Zumpt's Latin Grammar, has been lately translated from the German, by the REV. JOHN KENRICK, M.A.

JOHN GRANT, M.A., has published, in Octavo, an Excellent Latin Grammar, for the Improvement of Senior Scholars; and we may also mention Crombie's Gymnasium, and Hill's Latin SYNONYMES.

RUDDIMAN's Grammar is an Excellent Work; and is much used in Scotland;—and Bishop Wettenhall's Grammar, may be considered as the National Grammar of IRELAND.

LATIN WORKS ADAPTED FOR SCHOOLS.

DR. VALPY's Latin Delectus, his Latin Dialogues, his Latin Exercises, &c. &c., have gone through many Editions; and Greenwood's London Vocabulary, by Howard, is an excellent little Work; and has had an extensive Sale.—We may also mention Valpy's Latin Vocabulary, Elegantiæ Latinæ, and his Etymological Dictionary of the Latin LANGUAGE.

DYMCK's Cæsar, with Notes;—Clarke's Exercises;—Mair's Exercises;—Turner's Exercises;—and Ellis's Exercises, improved by Wrangham, Hincks, and Arnold.—Also, Howard's Introductory Exercises to those of Clarke, Turner, and Ellis.

NOTE.—KEYS to Valpy's Delectus, and Ellis's Exercises have been published, for the Use and Convenience of TEACHERS.

THE REV. C. BRADLEY's Cornelius Nepos, Eutropius, Phædrus, Fables, and Ovid's Metamorphoses;—also, Valpy's Virgil, Terence and Horace; his Selections from Ovid's Epistles, and Tibullus; Cæsar's Select Epistles; Four Plays of Plautus, and Juvenal and Persius, are all well adapted for the USE OF SCHOOLS.

LATIN DICTIONARIES.

THE REV. J. E. RIDDLE's Complete Latin-English Dictionary, and his Complete English-Latin Dictionary.—Abridgments of these two Valuable Works, have been published for the Use of SCHOOLS.

WE may also mention Entick's Latin Dictionary, improved by Crakelt, Sarjant, and Dr. Carey; and the Abridgment of Ainsworth's Latin Dictionary, by Dr. Morell, improved by Dr. Ross.

A VERY NEAT Abridgment of Ainsworth's Dictionary, for the Use of Schools, has been published by Dr. JOHN DYMCK.

LEMPRIERE'S Classical Dictionary, improved by Barker, is a valuable Work for Classical STUDENTS.

NOTE.—MANY other Latin Works might be mentioned; but these we consider sufficient for our PRESENT PURPOSE.

GREEK GRAMMARS.

THE ETON Greek Grammar has gone through numerous Editions, with various Improvements; and "The New Eton Greek Grammar," in Greek and English, with Practical and Philosophical Notes, by Clement Moody, is an Excellent Work; and has been well received by Classical Teachers.

WE must also mention, "An Easy Introduction to the Greek Tongue," by the Rev. T. V. Bayne; and Dr. Valpy's Greek Grammar, with Notes, for the Use of those who have made some Progress in the Language.

A GREEK GRAMMAR, and a Greek and English Vocabulary, have likewise been published by the REV. T. D. HINCKS.

GREEK WORKS ADAPTED FOR SCHOOLS.

DR. VALPY'S Greek Delectus, has gone through many Editions; and has received numerous Improvements, by the Author.—A "Second Greek Delectus,"—and a "Third Greek Delectus," have been published, by the Rev. F. Valpy, of Trinity College, Cambridge.

HOWARD'S Greek and English Vocabulary; and his Introductory Greek Exercises, and Key to the same, are valuable Works; and there is likewise a Key to Dr. Valpy's Greek Delectus.

THE REV. DR. MOSELEY has published "Easy Greek Exercises," with a Greek and English Lexicon of every Word in the Book;—and "Greek Exercises;" or, an Introduction to Greek Composition, with a Key to the same, have also been published by the REV. F. VALPY.

DR. NEILSON'S Greek Exercises, in Syntax, Ellipsis, Dialects, Prosody, &c. &c.; and his Key to the same, are valuable Works.

DR. MAJOR'S Greek Vocabulary; his Guide to the Reading of the Greek Tragedians; and Dr. Brasse's Greek Gradus, improved by Dr. Major, are Works of great Merit.

THE REV. JOHN SEAGER, has published improved Editions of Bos, on Greek Ellipsis;—Hermann, on Greek Metres;—Hoogeveen, on Greek Particles;—Maittaire, on Greek Dialects;—and Viger, on Greek Idioms.

THE CYROPRÆDIA of Xenophon, by E. H. Barker;—the Anabasis of Xenophon, by Belfour;—Euripides, by Dr. Major;—Sophocles, by Dr. Brasse, Mr. Burges, and the Rev. F. Valpy;—Æschylus, by Mr. Burges;—Herodotus, by Dr. Stoker;—Plato, by Mr. Burges;—Demos-thenes, by E. H. Barker;—Longinus on the Sublime, by D. B. Hickie;—

Homer's Iliad, by the Rev. E. Valpy;—and Dr. Bloomfield's Greek Testament, with English Notes, and a Map of PALESTINE.

NOTE.—THESE Eleven Splendid Greek Works, of the Ancient Authors; and also the Whole of Valpy's Works, are published by Longman and Co., LONDON.

GREEK LEXICONS.

WRIGHT's Greek and English Lexicon;—Hincks's Greek and English Lexicon;—Giles's Greek and English Lexicon;—Dunbar's and Barker's Greek and English Lexicon;—Dr. Major's Schrevelii, Greek and English;—Donnegan's Greek and English Lexicon; and Hederick's Greek and Latin Lexicon, improved by Larcher and BLOMFIELD.

DR. BLOMFIELD's Greek and English Lexicon, to the New Testament;—Robinson's Greek-English Lexicon, of the New Testament, improved by Dr. Bloomfield;—and Parkhurst's Greek and English Lexicon, to the New Testament, improved by ROSE.

NOTE.—WE might mention many other Greek Works; but these which we have noticed, will be found sufficient for the generality of STUDENTS.

BOOKS ON THE HAMILTONIAN SYSTEM; Published by Souter and Law, Fleet Street, London; and which may be had of all Booksellers.

LATIN.—THE GOSPEL of St. John;—Epitome Historiæ Sacre;—Æsop's Fables;—Phædrus's Fables;—Eutropius;—Aurelius Victor;—Cornelius Nepos;—Selectæ é Profanis;—Cæsar's Commentaries;—Celsus de Medicina;—Cicero's Orations;—Gregory's Conspectus;—Latin Verbs;—Salust;—Ovid;—and the First Six Books of VIRGIL'S ÆNEID.

GREEK.—THE GOSPEL of St. John; the Gospel of St. Matthew;—Æsop's Fables;—Analecta Minora;—Homer's Iliad;—and the Aphorisms HIPPOCRATES.

NOTE.—MESSRS. Souter and Law, have also published several Works, on the Hamiltonian System, in the French, German, Italian. and Spanish LANGUAGES.

BOOKS ON LOCKE'S SYSTEM; Published by Taylor and Walton, Upper Gower Street, London; and which may be had of all Booksellers.

LATIN.—PHÆDRUS's Fables of Æsop;—Ovid's Metamorphoses, Book I.;—Virgil's Æneid, Book I.;—Parsing Lessons to Virgil;—Cæsar's Invasion of Britain;—and the First Part of Tacitus's Life of AGRICOLA.

GREEK.—SELECTIONS from Lucian's Dialogues;—the Odes of Anacreon;—Homer's Iliad, Book I.;—Parsing Lessons to Homer;—Xenophon's Memorabilia, Book I.;—and Selections from the Histories of HERODOTUS.

NOTE.—MESSRS. Taylor and Walton, have also published several Works, on Locke's System, in the French, Italian, and German Languages.—They have likewise published, "The London Latin Grammar;" and the "The London GREEK GRAMMAR."

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OBSERVATIONS.

WE HAVE NOW, taken a VIEW of most of the ARTS and SCIENCES that are usually taught in SCHOOLS and COLLEGES; and, they certainly appear very NUMEROUS,—and almost too many for any ONE PERSON to ENCOUNTER, and to CONQUER!!

BUT we would direct the Attention of our YOUNG READERS, to the Sentiments expressed in the EXTRACT which we have chosen for our MOTTO; and also call to their Minds, the following beautiful, expressive, and characteristic LINES of the POET:—

“ A LITTLE LEARNING, is a dang'rous Thing;
 Drink deep, or taste not the Pierian Spring:
 There shallow Draughts intoxicate the Brain,
 And drinking largely, sobers Us AGAIN.”

POPE'S ESSAY ON CRITICISM.

REMARKS.

WE HAVE often said, that there ought to be BOARDS OF EXAMINATION, instituted in different Parts of the Kingdom, BY ACT OF PARLIAMENT; and, before any Person should be allowed to OPEN A SCHOOL, he should be EXAMINED, by some BOARD OF EXAMINERS; and receive a CERTIFICATE, specifying the different Sciences which he is qualified to TEACH.—After a Young Man had made further Improvement, he might undergo a Second Examination; and receive another Certificate, &c. &c.—This would be an

Effectual Means of making the Business of Schoolmasters, more Respectable;—would place that Profession upon a Level with other Professions;—would prevent many Impositions upon the Public;—might be accomplished at a very trifling Expense, either to the Government or to the Country;—and would be one of the GREATEST IMPROVEMENTS that has ever been made in the EDUCATION OF YOUTH.

ADDITIONAL NOTES.

1. WILLIAM NESBIT, Esq., of Longbenton, near Newcastle-upon-Tyne, has informed us, that the Jarrow Colliery is 170 Yards, and the Gosforth Colliery 360 Yards in Depth. (*See Organic Remains, in Coal Measures; Page Ninety-Six.*)

2. ARTESIAN WELLS, or Borings, have already been mentioned, on the One Hundred and Fourth Page of this Essay; and we may here state, that some of the most successful Borings, for Artesian Wells, in this Country, are those formed at Sittingbourne, by EDWARD SMITH, Esq.

3. SITTINGBOURNE is a Small Market Town, about Forty Miles from London, on the Great Dover Road, in the County of Kent; and is situated just on the Eastern Side of the "Great London Bason."—The Borings to which we have alluded, are about Twenty in Number; and they are carried to the Depth of about TWO HUNDRED AND EIGHTEEN FEET.

4. THE FIRST 168 Feet, consist of Chalk and Flint;—then, one Foot and a half of Kentish Ragstone;— $44\frac{1}{2}$ Feet of Chalk and Flint;—and, lastly, 4 Feet of Ragstone.

5. THE FIRST Spring was met with at the Depth of 32 Feet;—the 2nd, at 56 Feet;—the 3rd, at 86 Feet;—the 4th, at 112 Feet; and the 5th, at 169 Feet;—and no other Springs were found, to the Depth of 218 Feet, the Extent of the Borings.

6. FROM these various Borings, which are only at short Distances from each other, upwards of 1000 Gallons per Minute, are obtained.—The Springs rise with very considerable Force, above the Surface of the Ground; and uniting together, form an extremely beautiful Stream of clear, pellucid Water.

7. THE TEMPERATURE of the Water, is about 46 Degrees of Fahrenheit;—the Elevation of the Springs, is about 60 Feet above the Level of the Sea;—and they have flowed, without Intermission, for several Years;—as the Borings were completed in 1835.

8. MR. SMITH has informed us, that one of his Neighbours, was not so successful in obtaining Water, as himself; for, after boring, in 1841, through 254 Feet of Chalk and Flint, no Water was found that would rise to the Surface of the Ground;—such is the Uncertainty of these SPRINGS.

9. **MANY Organic Remains** have been found in the Counties of Kent, Essex, and Sussex.—We have seen, in the Possession of R. V. Mory, Esq., of Milton, near Sittingbourne, a beautiful Plank of Fossil Wood; 4 Feet 9 Inches in Length, and 12 Inches in Breadth. It is almost wholly turned into Stone; and the Grain of the Wood, is very perceptible. It is a Portion of an Elm Tree, found on the Estate of Delamark Banks, Esq. in the Parish of Warden, on the eastern Coast of the Isle of Sheppey.—The Trunk of the Tree, measured 22 Feet in Length; and was found embedded in the plastic Clay of that District.

10. **THE LAST Forty or Fifty Years**, may very properly be styled the Age of Improvements, in England; both in Agriculture, Mechanic Manufactures, and in the Generality of the Arts and Sciences.—As Proof of this, we may mention our Draining and Weeding Ploughs;—Sowing Drills;—Thrashing Machines;—Cotton Spinning;—Power Loom Weaving;—Calico Printing;—Cloth Dressing;—Letter-Press Printing;—and Copper-Plate, Steel-Plate, and Lithographic Engraving.

11. **BESIDES** the Improvements mentioned in the last Note, we may notice our Steam Engines;—Steam Navigation;—and Railroads;—and we may also observe, that great Advances have been made in Dyeing, Bleaching, Tanning, Malting, Brewing, Porcelain, &c. &c.; indeed, we may almost say, in every Art and Manufacture, which are carried on in the UNITED KINGDOM.—(See *Advancement of Science and Knowledge on the Fifty-Seventh Page.*)

12. **DRAWING**, has not yet been mentioned in this Essay; but we wish to REMARK, that this is a very Necessary and Useful Branch of Education; for it is required in Mensuration, Gauging, Land Surveying, Architecture, Civil Engineering, Military Affairs, Agriculture, Natural History, Geography, Navigation, Astronomy; and in Fact, we may say, in all the Arts and Sciences;—indeed, take away DRAWING, and we at once remove more than ONE HALF of the Useful and Liberal ARTS AND SCIENCES.

13. **MUSIC**, is one of the most Ancient Sciences; for, in the Fourth Chapter of Genesis, and the Twenty-first Verse, we read, that "Tubal was the Father of all such as handle the Harp and Organ." Indeed Music is a Natural Science;—we need only mention the Nightingale, the Sky Lark, the Thrush, and other Singing Birds;—hence, in studying and practising Music, we are only imitating the Natural Powers, by which the Almighty has endowed many of his most Highly Gifted, CREATURES.

14. We gladly embrace this Opportunity of presenting our Grateful Acknowledgments to G. F. Richardson, Esq., of the British Museum for his kind and polite Attentions, when we lately visited the Mineral Gallery, in Quest of PARTICULAR INFORMATION.

15. We are of Opinion, that our "Essay on Education," will make a very Useful Class Book; for, besides conveying a Great Deal of Information to Pupils, it will naturally tend to give them a Taste for Scientific, Literary, and GENERAL KNOWLEDGE.

CONCLUDING REMARKS.

OUR ORIGINAL INTENTION, was to write only a Short Essay, on the General Education of Youth, that might be sold at "One Shilling and Sixpence;" but as we advanced, we found the Subject of such Great Importance, and the Materials so ample, that we have carried the Work, to its present Extent; and we are now of Opinion that it will bear out the Title of "An Introduction to the Arts and Sciences"; as well as "An Essay on Education."

THE WORK will be found to contain a great Deal of Information, on almost every Subject relating to the Education of Youth; and Learners may pursue their Studies, to the utmost Extent, in the Books that we have recommended, which Works are among the Best and the most Popular, on their respective Subjects.

MANY Young Persons have been Much at a Loss, for a competent Knowledge of proper Books; and have, consequently, purchased Works that were not the best adapted for their Improvement; and we have no Doubt that some of our Senior Readers, can well remember the Time, when such a Work as the present, would have been of great Value to THEMSELVES.

IN this Essay, we have endeavoured to place each Department of Education, in its proper Light, and to show its Bearing on the Practical Affairs of Real Life and Business; for we are persuaded, that if the Intrinsic Value of Learning was better understood, Young Persons would pursue their Studies with more Diligence and Perseverance; and would save their Teachers much Trouble, in urging them to the Acquisition of those Sciences, which may prove of the greatest Advantage, in FUTURE LIFE.

MANY PARENTS appear quite satisfied, if their Children obtain just as much Learning as will qualify them for the Business, Calling, or Profession for which they are intended; but as no Person can foresee what Situations he may be called to fill, or what Parts he may have to sustain, in his Passage through Life, we would most strenuously press upon the Minds of our Young Friends, the Necessity and Advantage of obtaining all the Knowledge and Information of their Power.

THEY should not only be diligent and persevering in their

Studies, at School; but they should eagerly embrace every Opportunity of improving themselves, in their leisure Hours after they have gone to Business; and even, on some Occasions, there would be no Impropriety in "CONSUMING THE MIDNIGHT OIL."

WE would call to their Minds the Example of a Franklin, a Simpson, a Hutton, a Gregory, a Keith, a Passamaquoddy, Ryley; and we might mention many others, who by their Private Studies, and their Perseverance in the Pursuit of Knowledge, arrived at that Pitch of Real and Solid Learning which was a Credit and an Advantage to themselves, a Benefit to Society, and a Honour to the Land of their NATIVITY.

OH! How often have we regretted and lamented the Carelessness displayed by many Young Persons, after they have left School; who, instead of adding to their Stock of Knowledge, by their Private Studies, have actually lost a great Portion of the Information which they acquired, during the Time of their Education!!—This culpable Neglect, indeed; and cannot fall under too strong Reprehension!!!

It is a General Excuse, with Young Persons, that they do not know what Books to READ, and to STUDY, for Self Improvement; but, into whose Hands soever this Essay may fall, the Reader will not in Future, be able to avail himself of this Plea; for, we have furnished him with such a Catalogue of valuable and approved Works, on every Subject of Knowledge and Science, as cannot be found in any other Essay on Education, that has fallen under our INSPECTION.

WE feel confident that the numerous Extracts which we have given, from the Works of many of the First Authors, will be read with both Pleasure and Profit, by the Majority of Young Students; as they will thus be put in Possession of the Sentiments and Opinions of some of the Greatest of the Best, and the most Scientific Men, that have ever appeared on this WORLD'S EXTENDED STAGE.

THESE EXTRACTS will also tend to show the Value of the various Arts and Sciences;—the high Estimation in which they have been held, by Men of sound Judgement, and Experience and great Erudition;—and to point out the Practical Utility and Application, in those multifarious Pursuits which occupy the Time and engage the Attention of the CHILDREN OF MEN.

GEOLOGY is a very interesting, and a very wonderful Science; and brings before our Minds, the Habits, Shapes, and Sizes of many of those astonishing Animals which inhabited this Planet, in Ages that are FAR GONE BY.—This Subject has not received much Attention in Schools, nor from Young Persons, after they have left School; and we please ourselves with the Anticipation that the few Remarks which we have made, on this Science, will induce our Readers to turn their Attention to the Works of Higgins, Lyell, Mantell, Buckland, Sumner, and other MODERN GEOLOGISTS.

ASTRONOMY is an ancient and a sublime Science; and makes us acquainted with the Sizes, Distances, and Velocities of the Heavenly Bodies; and in some Measure, with the Extent and the Immensity of the UNIVERSE.—The Study of this Science leads us directly to the Contemplation of the Mighty Works of the Creator;—it elevates our Minds, and expands our Ideas;—and inspires us with Sentiments of Astonishment, Adoration, and Praise.—We trust that the few brief Remarks that we have made, on this Subject, will be read with Pleasure and Profit by our Young Friends; and will lead them to the careful Perusal of the Works of Guy, Squire, Ferguson, Gregory, Bonnycastle, Herschel, Nichol, and other Authors who have written largely on this SCIENCE.

POETRY has not received so much Attention in the generality of Schools, nor yet from Young People, as its intrinsic Value and Utility demand; and we anticipate that the few beautiful Extracts which we have given, will be a Means of producing a greater and a more refined Taste for the Reading of our best and most approved POETICAL WORKS.—The Observations and Remarks which we have made, on the Works, and on the Merits of our “British Poets,” will furnish our Young Readers with a KEY to those Productions; and will prove useful and valuable Guides, in choosing and selecting Works for the Formation of their POETICAL LIBRARIES.

WE HOPE that our Remarks on RELIGIOUS EDUCATION, will meet with the cordial Approbation of every Sect, Party, and Denomination of Christians; as we have recommended the Inculcation of no Principles, but those of Pure Christianity.—This Subject, however, is of the utmost Delicacy, and of the greatest Importance; and we can assure our Readers, that we approached it with considerable Re-

luctance, and with much Caution; knowing that this is a Question which has convulsed the United Kingdom of Great Britain and Ireland, from End to End, and from Side to Side.

REFERRING to the One Hundreth and Seventy-seventh Page of this Essay, it will be seen that we have not been unmindful of the Mental, the General, and the Scientific Improvement of "The Daughters of England."—This is, undoubtedly, an Object of the First Importance; whether we consider it in a Private, or in a Public Point of View.

THE FIRST Principles of Education, are generally inculcated by the MOTHER; and if the Foundation be false and unsound, the Superstructure must inevitably prove dangerous, not only to particular Individuals, but also to private Society, and to the GENERAL PUBLIC.

WE would, therefore, most earnestly but affectionately, advise "The Daughters of England," to store their Minds well with Historical, Biographical, Philosophical, and General Knowledge; in Order that they may be properly qualified to discharge their important Duties, to the Rising Generation, with Prudence, Propriety, and Success!!

BEFORE we close our Remarks, we would again, address ourselves to "The Sons of Great Britain."—They should not only consider their Education and Improvement, in an Individual, but also in a National Point of View.—The Future Destinies of this Great and Mighty Empire will VERY SOON be placed in their Hands; and upon their Knowledge, Prudence, Firmness, and Courage, it will greatly depend, whether we may still continue to RISE, in the Scale of Nations; or whether we may begin gradually to DECLINE; and at Length, entirely FALL, and even CEASE to be an Independent Nation, like the Ancient, Renowned and Mighty Empires of Babylon, Assyria, Persia, Greece, and ROME!!!

No. 38, Kennington Lane,
April 25th, 1842.

A. NESBIT.
J. C. NESBIT.
E. P. NESBIT.

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ADVERTISEMENTS.

RS. NESBIT beg to return their most GRATEFUL
 , for the prompt and generous Assistance afforded
 n the Occasion of their late Calamitous Fire; and
 continued Christian Kindness displayed by their

also wish to inform their Friends and the Public,
 y have taken a Commodious House, No. 26, Chester
 or the Accommodation of their Family and Boarders,
 eir own House is rebuilt; which will be done as
 ously as possible, with every Convenience for the
 on of about THIRTY BOARDERS.

THEIR Excellent SCHOOL ROOM having escaped the Ravages of the Fire, the Business of the School is still carried on as usual; and they trust by their constant Assiduity and Perseverance, to merit the Continuation of that Patronage with which they have already been so HIGHLY HONOURED.

No. 38, Kennington Lane, April 25th, 1842.

MR. NESBIT'S WORKS are all published by Longman and Co., London; Wilson and Sons, York; and may be had of all Booksellers. The Price of the Surveying, is 12s.; Mensuration, 6s.; Gauging, 5s.; Arithmetic, 5s.; and the Parsing, 2s. 6d. The Key to the Mensuration sells at 5s.; Key to the Arithmetic at 5s.; and that to the Gauging, at 4s. BOUND.

MR. J. C. NESBIT most respectfully informs his Friends and the Public, that he gives Instructions on Chemistry, Electricity, Galvanism, Magnetism, Electro-Magnetism, and other Branches of Natural Philosophy; illustrating and exemplifying the various Departments, by numerous Practical Experiments.

J. C. NESBIT has studied Chemistry and other Branches of Natural Philosophy, for several years; has been under the Tuition of Dr. Dalton, of MANCHESTER, to whom he is kindly permitted to refer; and also to Dr. D. Boswell Reid, F.R.S.E., F.R.C.P.E.; Lecturer to the Edinburgh Society of Arts; Author of Elements of Practical Chemistry, &c. &c.; Duke Street, WESTMINSTER.

THE TERMS and other Particulars may be known on APPLICATION.

MR. JACOB NESBIT, who purchased our Premises, and succeeded us in Sidney Street, Manchester; has excellent Accommodation for a Limited Number of Young Ladies, as Pupils and Boarders.—The Terms of the Establishment, and other Particulars may be known on APPLICATION.



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